Principles of Economics

Introduction

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What is Economics

- Economics[1], as a study in human behavior, relates to all of us. Behind the theory of Economics are stories of people and their lives as consumers, workers, and entrepreneurs in an inter-connected world.
- It is the story of
  - a Brazilian farmer who grows coffee beans brewed into espresso in Paris.
  - a New York architect working with engineers in Tokyo to build a school in Cairo.
  - a Chinese migrant worker who sends money home so that his children can go to college.

[1]The word *Economics* derives from the Greek word *Οἰκονομικά*, meaning: household management.

What is Economics

- To study Economics is to study the choices that people make as consumers, workers, and entrepreneurs, given the constraints they face in a world of limited resources, and the individual and collective consequences of their choices.
    - Every economic issue involves, at its most basic level, individual choice – decisions by an individual about what to do and what not to do.
    - The fundamental reason that people need to make choices is **scarcity**: our unlimited wants exceed our limited resources.
    - Individual choices are not independent. Each person's choices can affect other people. Hence it is important to study the interaction of individual choices and their collective consequences.

What is Economics

"Economics is a science which studies human behavior as a relationship between ends and scarce means which have alternatives uses." – Lionel Robbins, Essay on the Nature and Significance of Economic Science[2]*.*

[2]See Backhouse and Medema (2009) for an account of the evolution of the definition of Economics.

What is Economics

Three fundamental questions that Economics, through the study of individual choices, seeks to answer[3]:

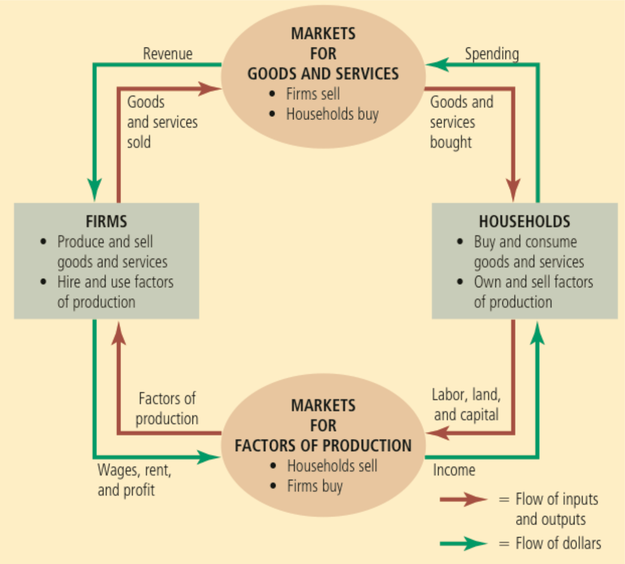
1. What goods and services are produced?
2. How are resources used in producing these goods and services?
3. Who gets the goods and services?

[3] In short: *what*, *how*, and *for whom*?

What is Economics

- **Microeconomics**
  - How individuals and households decide what to buy, how much to work, how much to save, etc.
  - How firms decide what to produce, how much to produce, how many workers to hire, etc.
  - The interaction of households, firms, and governments in markets for particular goods and services.
- **Macroeconomics**
  - Aggregate outcomes of household, firm, and government choices, including inflation, unemployment, business cycles, and economic growth.

A Circular Diagram of the Economy



Economic Assumptions on Human Behavior

To study individual choices, we need models of decision-making. Most economic models assume that people are **rational** (*Homo Economicus*).

Assumption (The Rationality Assumption)

Individuals make choices by evaluating the costs and benefits of each available option, based on the information they have at the time, and picking the best alternative.

- Simply put, the rationality assumption states that "people always do the best they can."[4]
- In many cases, this is a strong but reasonable approximation to the idea that "people generally attempt to do the best they can".

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[4] When there is uncertainty regarding the costs and benefits of some options, the rationality assumption assumes that people can correctly calculate the *expected* benefits and costs of those options conditional on the information they have.

Economic Assumptions on Human Behavior

The rationality assumption implies that:

- People respond to incentives.
- An option will be chosen if its benefit $>$ its opportunity cost.
- "How-much" choices are made at the margin.

People respond to incentives

Incentive: something that changes the relative costs and/or benefits of the options that people face.

- When gas taxes rise, people use public transportation, and travel less.
- When interest rates rise, people save more and consume less.

> *"Most of economics can be summarized in four words: 'People respond to incentives.' The rest is commentary." – Steven Landsburg, The Armchair Economist*

Opportunity Cost

- Every choice involves a tradeoff: when you choose something, you have to give up something else.
- The cost of something is the value of what must be given up in order to have it.
- **Opportunity cost**: the value of the next best alternative.
- A rational person chooses an option as long as its benefit is greater than its opportunity cost.

Opportunity Cost

Opportunity cost can include both **explicit (direct) cost** and **implicit (indirect) cost**.

- The cost of going to college
  - Explicit cost: tuition, etc.
  - Implicit cost: lost wages, etc.
- The cost of seeing a movie
  - Explicit cost: movie ticket
  - Implicit cost: the highest value you can get by using the time to do something else

Opportunity Cost

Example

An individual is facing three options. The benefits associated with each option are (π_1, π_2, π_3). The direct costs associated with each option are (d_1, d_2, d_3). Suppose $\pi_1 - d_1 > \pi_2 - d_2 > \pi_3 - d_3$. Let c_i denote the opportunity cost of option i. Then

- $c_1 = \pi_2 - d_2 + d_1$. The individual will choose option 1 if $\pi_1 > c_1$. Since this is true, option 1 will be chosen.
- $c_2 = \pi_1 - d_1 + d_2$. The individual will choose option 2 if $\pi_2 > c_2$. Since this is not true, option 2 will not be chosen.
- $c_3 = \pi_1 - d_1 + d_3$. The individual will choose option 3 if $\pi_3 > c_3$. Since this is not true, option 3 will not be chosen.

Opportunity Cost

Example

You are given a free ticket to see a performance at Banlam Theatre (which has no resale value). The Xiamen Philharmonic is performing on the same night and is your next-best alternative activity. Tickets to the Xiamen Philharmonic concert cost 60 yuan. On any given day, you would be willing to pay up to 100 yuan to attend a Xiamen Philharmonic concert. Assume there are no other costs of seeing either performance. What is the opportunity cost of going to see the performance at Banlam Theatre?

Opportunity Cost

Example (Sunk Cost Irrelavancy)

A 200-seat plane is about to take off with 10 empty seats. The flight costs the airline \$100,000. A passenger arriving at the last minute is hoping to purchase a ticket for one of the remaining seats. How much should the airline charge her?

Opportunity Cost

Optimal decisions are made at the margin

When the choice is on "*how much*", a rational person makes decision by comparing marginal benefits and marginal costs.

- **Marginal benefit** (**MB**): the benefit from a small increase in the amount of the chosen option
- **Marginal cost** (**MC**): the opportunity cost of a small increase in the amount of the chosen option

Optimal decisions are made at the margin

Example: Marginal Analysis

You are trying to decide how much time to spend on watching TV tonight instead of studying. Let $\pi(t)$ be the benefit of watching t minutes of TV tonight. Let $c(t)$ be its opportunity cost[a]. Then $\pi'(t)$ is the marginal benefit of watching 1 more minute of TV when you have already watched t minutes and $c'(t)$ is the marginal cost of watching 1 more minute of TV when you have already watched t minutes.

To choose the optimal TV watching time, you should choose a t^* that maximizes $\pi(t) - c(t)$. Equivalently, you should continue watching TV as long as $\pi'(t) > c'(t)$, and until $\pi'(t) = c'(t)$ (if that ever happens)[b].

[a] Assuming no direct costs to watching TV or studying, $c(t) =$ the benefit of using the t minutes to study.

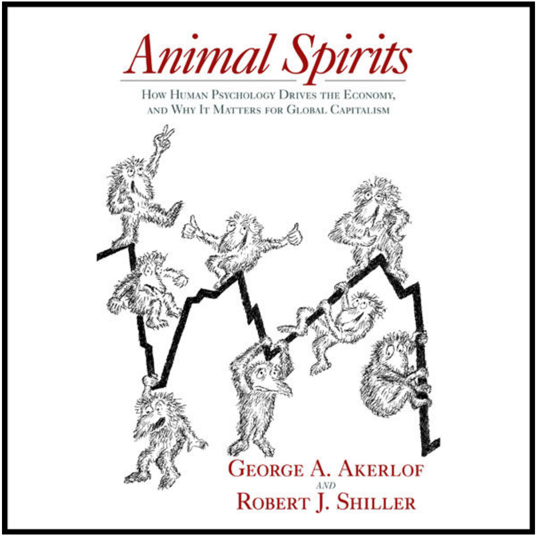
[b] If $\pi'(0) > c'(0)$, $\pi''(t) < 0$ (decreasing marginal benefit) and $c''(t) > 0$ (increasing marginal cost), then there must exist a $t^* > 0$ such that $\pi'(t^*) = c'(t^*)$.

Beyond Rationality

In many situations, people's choices may exhibit departures from the rationality assumption:

- reference dependence
- hyperbolic discounting
- overconfidence
- loss aversion
- herding instinct
- etc.

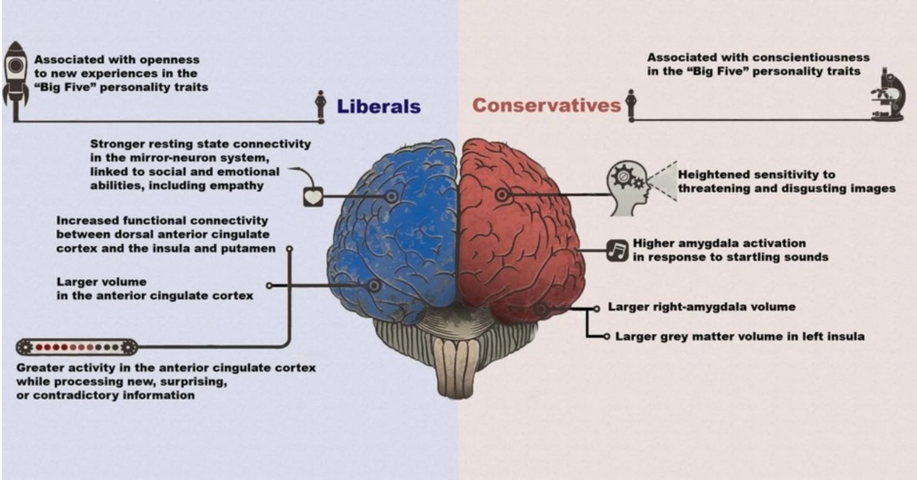
Beyond Rationality



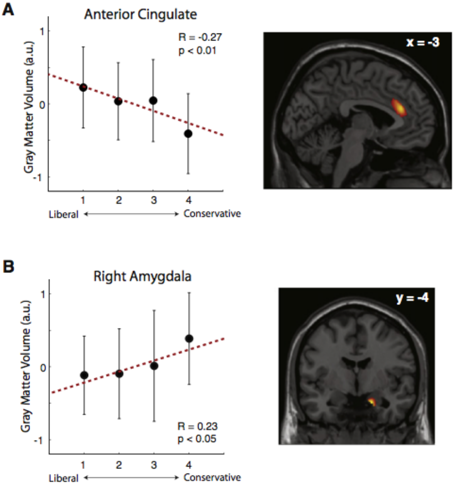
Beyond Rationality

- **Behavioral Economics** studies the effects of psychological, social, cognitive, and emotional factors on the economic decisions of individuals, using tools such as laboratory experiments.
- **Neuroeconomics** aims to provide a neurobiological foundation to economic decision-making.

Beyond Rationality

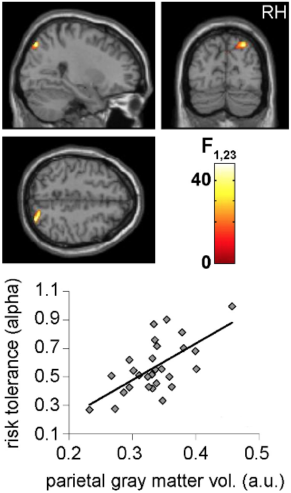


Beyond Rationality



Brain Structure and Political Orientation. Source: Kanai et al. (2011)

Beyond Rationality



Gray matter volume of a region in the right posterior parietal cortex predictive of individual risk attitudes. Source: Gilaie-Dotan et al. (2014)

Economics as Social Science and Policy Tool

- Economics is both a social science and a toolkit for advising on policy.
- Science progresses through the formulation and testing of theory. A defining characteristic of scientific theory is **falsifiability**.
  - A theory is falsifiable if it is possible, in principle, to prove it wrong using evidence.
    - e.g., the statement "the sun will rise in the morning" is falsifiable, while the statement "unicorn exists" is not[5].
- Similarly, Economics works by formulating economic theories and testing their hypotheses using data.

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[5] In many cases, we will never be able to prove a theory "right": even if it has been tested correct 1000 times, it can fail on the 1001^{th} time. Passing each test, however, means that the theory is less likely to be wrong and this is the nature of our scientific knowledge.

Economics as Social Science and Policy Tool

- As social science, Economics makes **positive statements** about how the economy works.
  - A positive statement is a claim about how the world is.
  - One type of positive statements that Economics – and social sciences in general – is particularly interested in making are **causal statements**: statements about cause and effect.
    - e.g., "minimum-wage laws cause unemployment."
  - Positive statements, in order to be scientific, must be falsifiable.

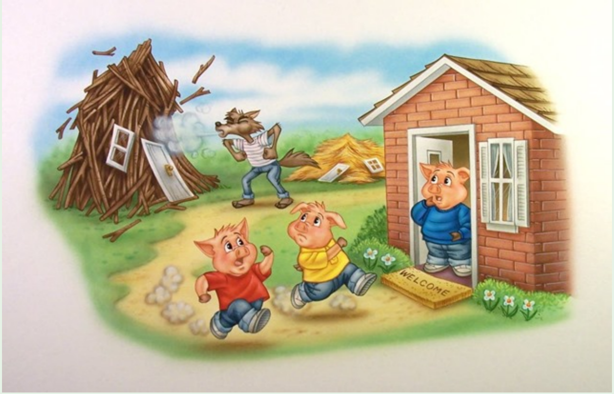
Economics as Social Science and Policy Tool

- As a policy tool, Economics makes **normative statements** about whether an economic outcome is desirable and how to improve it.
  - A normative statement is a claim about how the world ought to be.
    - e.g., "the government should not raise the minimum wage."
  - Normative statements contain value judgement and hence cannot be judged using data alone.

Economics as Social Science and Policy Tool

The Three Little Pigs

"Little pig, little pig, let me come in!"
"No, no, by the hairs on my chinny-chin-chin!"
"Then I'll huff and I'll puff and I'll blow your house in!"



Economics as Social Science and Policy Tool

The Three Little Pigs

Why did the three piggies build different houses?

- They vary in their work ethic (standard interpretation)
- They have different income or face different costs
- They vary in their risk expectation
- They have the same risk expectation but have different degrees of risk aversion.

These are *positive statements* about the possible causal mechanisms that result in different piggie behavior.

Economics as Social Science and Policy Tool

The Three Little Pigs

What should the piggie government do?

- Government should invest in school programs that teach piggies to work hard and don't slack.
- Government should educate piggies on the risk of wolfies.
- Government should subsidize brick housing.
- Government should mandate brick houses in construction standards.
- Government should leave the piggies alone. The loss of two piggies doesn't suggest market failure. If piggies think it optimal not to invest *ex ante* and end up suffering losses *ex post*, so be it.

These are *normative statements* about what to do.

Reference I

- Backhouse, R. E. and S. G. Medema. 2009. "Retrospectives: On the Definition of Economics," *Journal of Economic Perspectives*, 23(1).
- Gilaie-Dotan, S., A. Tymula, N. Cooper, J. W. Kable, P. W. Glimcher, and L. Levy. 2014. "Neuroanatomy Predicts Individual Risk Attitudes," *Journal of Neuroscience*, 34(37).
- Kanai, R., T. Feilden, C. Firth, and G. Rees. 2011. "Political Orientations Are Correlated with Brain Structure in Young Adults," *Current Biology*, 21(8).