UNITED STATES MILITARY ACADEMY

WEST POINT

SS201: Principles of Economics

Lesson 2: Economic Methods, Models, and Gains from Exchange

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Agenda

- Admin (5 min)
- Economic Theory / Modeling (10 min)
- Comparative Advantage / Trade (35 min)
- Calculus Primer (20 min)

Admin

- Issue Analysis Essay
  - Topic due 27SEP
- PS1
  - Cengage due NLT 07 2359 SEP
  - Handout due in class 08SEP
- Laptops next class for in-class survey
- Questions from last night's reading / pre-class assignment?

Economic Theory / Modeling

Economics is a **POSITIVE** Social Science

POSITIVE Statements…

- Describe the way the world is.
- Are hypotheses to be proven true or false.

Example: Women participate in the labor market at a lower rate than men. Career interruptions due to children contribute to much of this difference.

NORMATIVE Statements

- Describe the way the world should be.
- Rely on values and worldviews.

Example: The government should prioritize providing free childcare to increase the participation of women in the workforce.

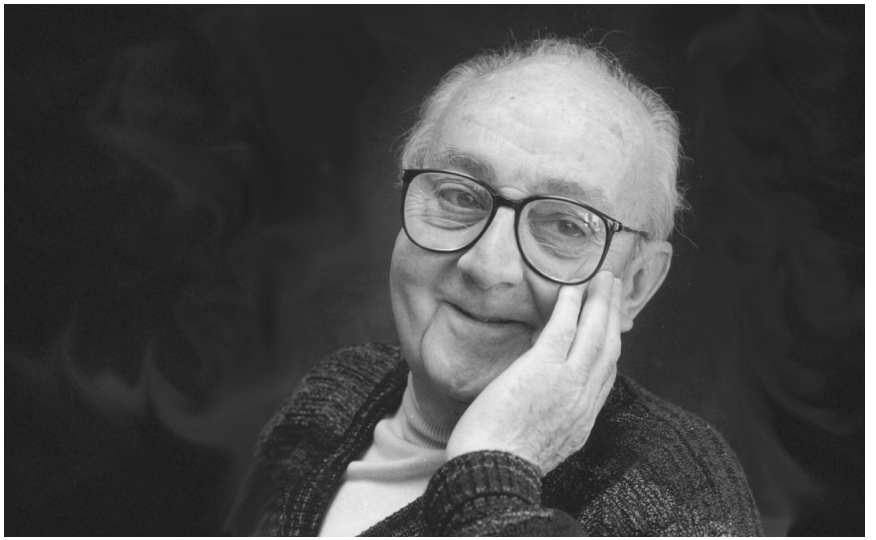
Economic Theory / Modeling

Models Require

- Facts
- Assumptions
- Structure

Models Provide

- Predictions
- Testable Hypotheses



"Essentially, all models are wrong, but some are useful."
George E.P. Box

Comparative Advantage / Trade

Economic Leader Principle #1

There is a **trade-off** in every decision a leader makes. What we give up constitutes the **opportunity cost** of a decision.

Economic Leader Principle #4

Trade can make all parties better off by creating a **"win-win."** Leaders realize the benefits from trade by facilitating **specialization** and **comparative advantage** amongst the people they lead.

Comparative Advantage / Trade

Define the Following:

- Production Possibilities Frontier
- Opportunity Cost
- Absolute Advantage
- Comparative Advantage

Assumptions:

Comparative Advantage / Trade

Board Problem #1

Suppose MAJ Homme can only do two things on a Sunday afternoon: grill steaks or smoke turkeys. If he spends all his time grilling, he can grill 25. If he only smokes turkeys, he can smoke 5 turkeys. Assume he can switch between tasks at a constant rate.

1. Sketch a plausible production possibility frontier curve. Label axes and describe the opportunity cost of smoking 1 turkey.

2. At which point should MAJ Homme produce?

3. Suppose a new grill allows MAJ Homme to grill faster so that in any fixed amount of time, he can grill more steaks. What would the new production possibility frontier curve look like?

Comparative Advantage / Trade

Board Problem #2

Suppose that in the U.S. producing an aircraft takes 10,000 hours of labor and producing a shirt takes 2 hours of labor. Suppose that in China producing an aircraft takes 40,000 hours of labor and producing a shirt takes 1 hour of labor. Suppose China is endowed with 120,000 hours of labor and the U.S. is endowed with 100,000 hours of labor.

1. What is the opportunity cost of a shirt in the U.S.? In China? What about an aircraft?

2. Which country has an absolute advantage in aircrafts? In shirts? What is each countries' comparative advantage?

3. What good will the U.S. export and what is the minimum price they must receive in order to export it?

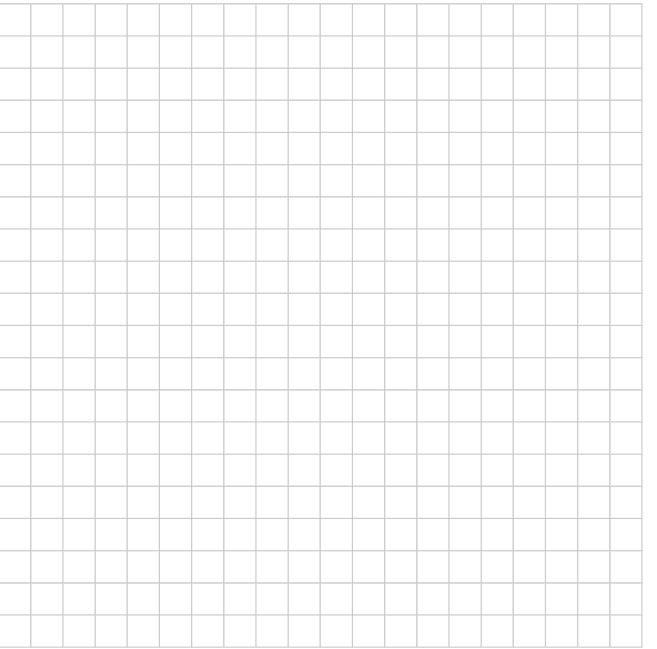
Calculus Primer

Derivatives in 2D

Overview

- What do derivatives tell us?
- Why is this important?

What this Means Graphically



Calculus Primer

Constrained Optimization

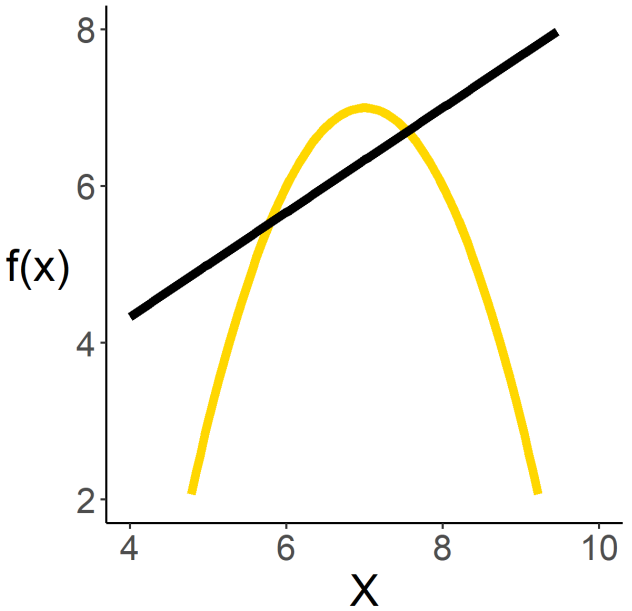
So if a derivative tells us rates of change of our function, then how do we find mins / maxes?

1. Find points where your **First-Order Necessary Condition (FONC)** is satisfied (critical points).
    - $f'(x) = 0$
2. Find sign of **Second-Order Sufficient Condition (SOSC)** at those critical points.
    - $f''(x) \geq 0$ or $f''(x) \leq 0$
3. Check your work / confirm those points are better than **"corner solutions."**

Calculus Primer

Constrained Optimization in 2D

So if I wanted to maximize $f_1(x) = -(x-7)^2 + 7$ subject to $f_2(x) = \frac{2}{3}x + \frac{5}{3}$, how would I find it?



Calculus Primer

Derivatives in 3D

Overview

- What is a partial derivative?
- Why is this important?

Notation

Say I have a function:

$$U(x_1, x_2)$$

Partial Derivatives:

$$\frac{\partial U}{\partial x_1} \text{ and } \frac{\partial U}{\partial x_2}$$

Partial Derivatives are **EASY**:

1. $f(x) = x^2$
2. $f(x, y) = \alpha x^3 + \beta y^2 + \gamma x$
3. $U(x_1, x_2) = \delta x_1^{\frac{1}{4}} x_2^{\frac{3}{4}}$

Calculus Primer

Graphs / Constrained Optimization in 3D

Transition to iPad...

Econ Graphs

Next time...

- Consumer Choice Theory
- Applying Constrained Optimization to Maximize Utility