

AAE 635

Applied Microeconomic Theory

Fall 2009

8/31/2009

Today & next class

- Syllabus
- Introduction (lecture note 1)
- Theory of the Firm (lecture note 1, HV chapter 2)
 - Profit maximization firms' problem

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Syllabus

Class website: <http://www.aae.wisc.edu/aae635/main.asp>

- Textbooks:
 - Lecture notes and slides posted online
 - Hal R. Varian, "Microeconomic Analysis," Third Edition
 - (Optional) Eugene Silberberg and Wing Suen, "The Structure of Economics: A Mathematical Analysis," Third Edition
- (Recommended) Sydsater, K., A. Strom and P. Berck. "Economists' Mathematical Manual"
- Grading:
 - One Midterm 30%
 - One Final 40%
 - Six Homework 30%
 - You can work in teams, but need to deliver your own answers
- TA: Xingliang Ma, xma2@wisc.edu

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1.1 Introduction: What is Microeconomics?

- Allocate scarce resources to competing needs
- "Micro" level
 - Individuals (consumer, firm, ...)
 - Aggregate effects
- Questions
 - Economic decision rule
 - Economic rationality
 - Economic efficiency
- Positive studies vs. normative studies
 - A normative statement expresses a judgment about what ought to be, whether a situation is desirable or undesirable, → policy recommendations
 - A positive statement is a statement about what is and that contains no indication of approval or disapproval, → explanation and understanding

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1.1 Introduction: Topics to be covered

- Firms' optimization problem
- Consumers' optimization problem
- Duality in analyzing economic behaviors
- Welfare consequences
- General equilibrium analyses

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1.2 Neoclassical Theory of the Firm

- Firms' objective: profit maximization

$$\underset{\mathbf{x}, y}{Max} \quad \pi = p \cdot y - \mathbf{w} \cdot \mathbf{x}$$

$$s.t. \quad y \leq g(\mathbf{x}),$$

where \mathbf{x} is a vector of inputs, y is output,
 $y = g(\mathbf{x})$ is the PPF (production possibility frontier),
 p and \mathbf{w} are prices of the output and inputs (as given).

Rewrite it if $p > 0$ (why?): $\underset{\mathbf{x}}{Max} \quad \pi = p \cdot g(\mathbf{x}) - \mathbf{w} \cdot \mathbf{x}$.

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1.3 Firm's decision problem: single input

- Example 1: Revenue function is: $R(x) = 200x - 4x^2$
Cost function is: $TC(x) = w \cdot x$

- How do we solve firm's problem?

- Given interior solutions, applying the first order condition

$$\frac{\partial \pi}{\partial x} = 0$$

- $MR = MC \rightarrow x^*(w)$: Input demand function
- Moreover, the slope of the profit maximization input demand curve must be downward sloping, why?

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1.4 Necessary conditions and sufficient conditions

- **A implies B; $A \Rightarrow B$; if A then B**
 - **B** is necessary for **A**
 - **A** is sufficient for **B**
- FOC is necessary but not sufficient for profit maximization, given interior solutions. Why? See figure 1.2, and proof in lecture note
- Why "interior" solutions? Figure 1.4
 - Kuhn-Tucker conditions \rightarrow first order necessary conditions (FONC)
- The second order sufficient condition (SOSC) and SONC for a local maximum and a local minimum

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