INTRODUCTORY ECONOMICS: LECTURE 1

The Fundamentals of Economics

Highlights

- *What is Economics?*
- *Microeconomics*
- *Opportunity cost*
- *Accounting vs. Economic Profit*
- *Time value of money*
- *Marginal Analysis*
- *Positive & Normative Analysis*

Economics

- The science of *making decisions* in the presence of *scarce resources*.
  - Who makes decisions? Micro: firms, individuals; Macro: governments, countries
  - *Resources* are anything used to produce a good or service, or achieve a goal.
  - *Decisions* are important because **scarcity** implies **trade-offs**.
  - ***Essentially a constrained optimization, like engineering.***

Economics as constrained optimization

- **For consumers (consumer theory):**
- Consumers maximize their well-being
- Constraints:
  - Limited incomes
  - Prices of goods or service
  - E.g., With 50 DKK in hand , how many apples and bananas to buy?

Economics as constrained optimization

- **For firms (managerial economics):**
- Firm's overall goal is to maximize profits
- Constraints make it difficult to achieve goals
  - Available technology
  - Prices of inputs used in production

Opportunity cost

- **Opportunity cost**
  - The opportunity cost of any item is whatever must be given up to obtain it.
  - Explicit cost + implicit cost: The explicit cost of a resource plus the implicit cost of giving up its best alternative.
  - Examples: sleeping at home; doing PhD

Profits

- **Accounting profit**
  - Total amount of money taken in from sales (total revenue) minus the dollar cost of producing goods or services.
- **Economic profit**
  - The difference between total revenue and *opportunity* cost.

Markets

- Market is the place for the two sides (buyer and seller) to make transactions.
- Bargaining position of consumers and producers is limited by three rivalries in economic transactions:
  - Consumer-producer rivalry
  - Consumer-consumer rivalry
  - Producer-producer rivalry
- Government and the market

Time Value of Money

- Often a gap exists between the time when costs are borne and benefits received.
  - Managers can use *present value analysis* to properly account for the timing of receipts and expenditures.

Present Value Analysis 1

- Present value of a *single* future value
  - The amount that would have to be invested today at the prevailing interest rate to generate the given future value:

$$PV = \frac{FV}{(1+i)^n}$$

  - Present value reflects the difference between the *future value* and the *opportunity cost of waiting*:

$$PV = FV - OCW$$

Present Value Analysis II

- Present value of a *stream of* future values

$$PV = \frac{FV_1}{(1+i)^1} + \frac{FV_2}{(1+i)^2} + \cdots + \frac{FV_n}{(1+i)^n}$$

or,

$$PV = \sum_{t=1}^{n} \frac{FV_t}{(1+i)^t}$$

The Time Value of Money in Action

- Consider a project that returns the following income stream:
  - Year 1, $10,000; Year 2, $50,000; and Year 3, $100,000.
  - At an annual interest rate of 3 percent, what is the present value of this income stream?

$$PV = \frac{\$10{,}000}{(1+0.03)^1} + \frac{\$50{,}000}{(1+0.03)^2} + \frac{\$100{,}000}{(1+0.03)^3}$$
$$= \$148{,}352.70$$

Net Present Value

- The present value of the *income stream* generated by a project minus the current cost of the project:

$$NPV = \frac{FV_1}{(1+i)^1} + \frac{FV_2}{(1+i)^2} + \cdots + \frac{FV_n}{(1+i)^n} - C_0$$

Rational People Think at the Margin

- Examples:
  - When a student considers whether to go to college for an additional year, he compares the fees & foregone wages to the extra income he could earn with the extra year of education.
  - When a manager considers whether to increase output, she compares the cost of the needed labor and materials to the extra revenue.

Use Marginal Analysis

- Given a control variable, Q, in a managerial objective, denote the
  - total benefit as $B(Q)$.
  - total cost as $C(Q)$.
- Manager's objective is to maximize net benefits:

$$N(Q) = B(Q) - C(Q)$$

Use Marginal Analysis

- How can the manager maximize net benefits?
- Use marginal analysis
  - **Marginal benefit:** $MB(Q)$
    - The change in total benefits arising from a change in the managerial control variable, Q.
  - **Marginal cost:** $MC(Q)$
    - The change in the total costs arising from a change in the managerial control variable, Q.
  - Marginal net benefits: $MNB(Q)$

$$MNB(Q) = MB(Q) - MC(Q)$$

Use Marginal Analysis

- Marginal principle
  - To maximize net benefits, the manager should increase the managerial control variable up to the point where marginal benefits equal marginal costs. This level of the managerial control variable corresponds to the level at which marginal net benefits are zero; nothing more can be gained by further changes in that variable.

Marginal Analysis In Action

- It is estimated that the benefit and cost structure of a firm is:

$$B(Q) = 250Q - 4Q^2$$

$$C(Q) = Q^2$$

- Find the $MB(Q)$ and $MC(Q)$ functions.

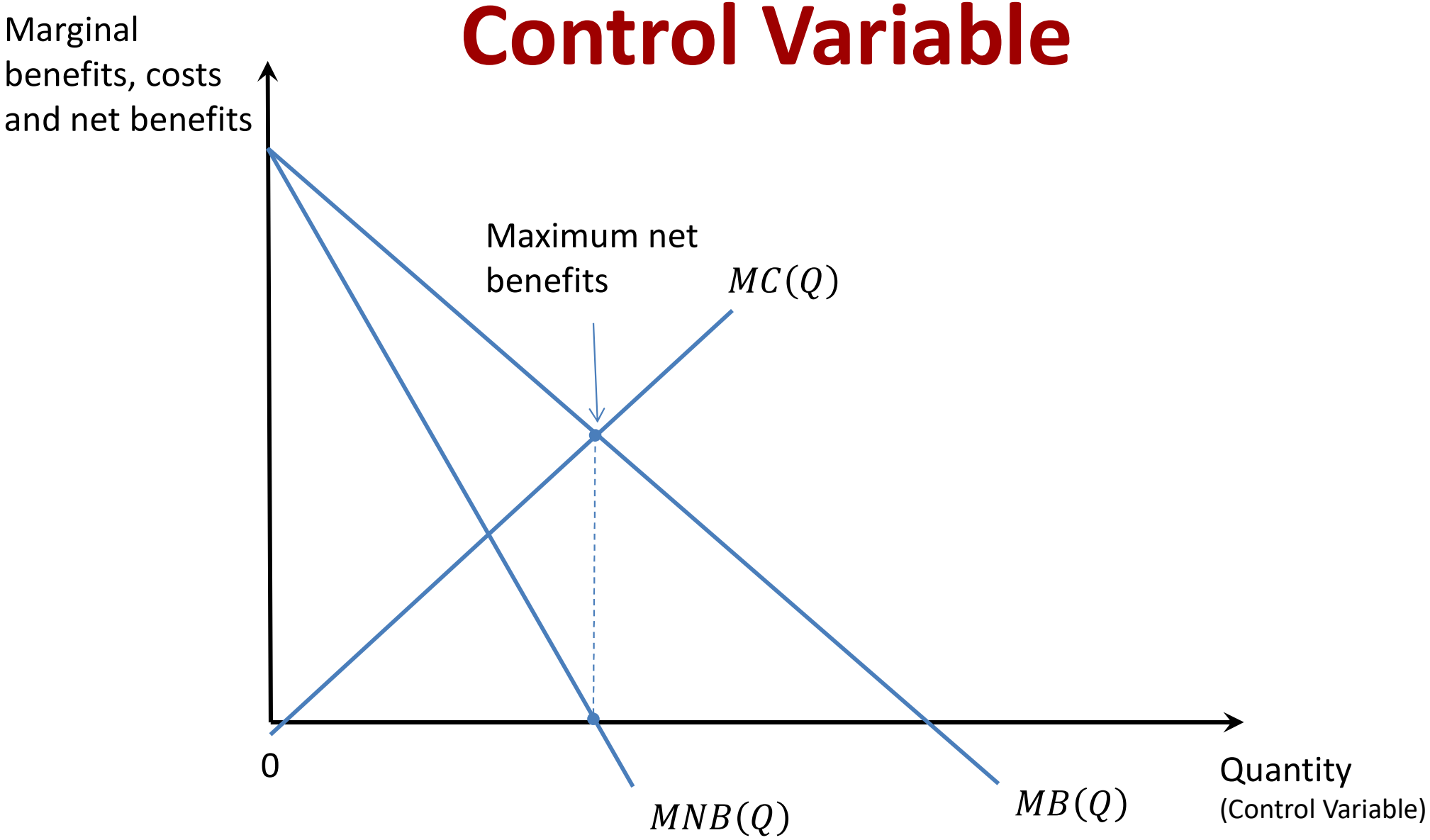
$$MB(Q) = 250 - 8Q$$

$$MC(Q) = 2Q$$

- What value of Q makes $MNB(Q)$ zero?

$$250 - 8Q = 2Q \Rightarrow Q = 25$$

Determining the Optimal Level of a Control Variable



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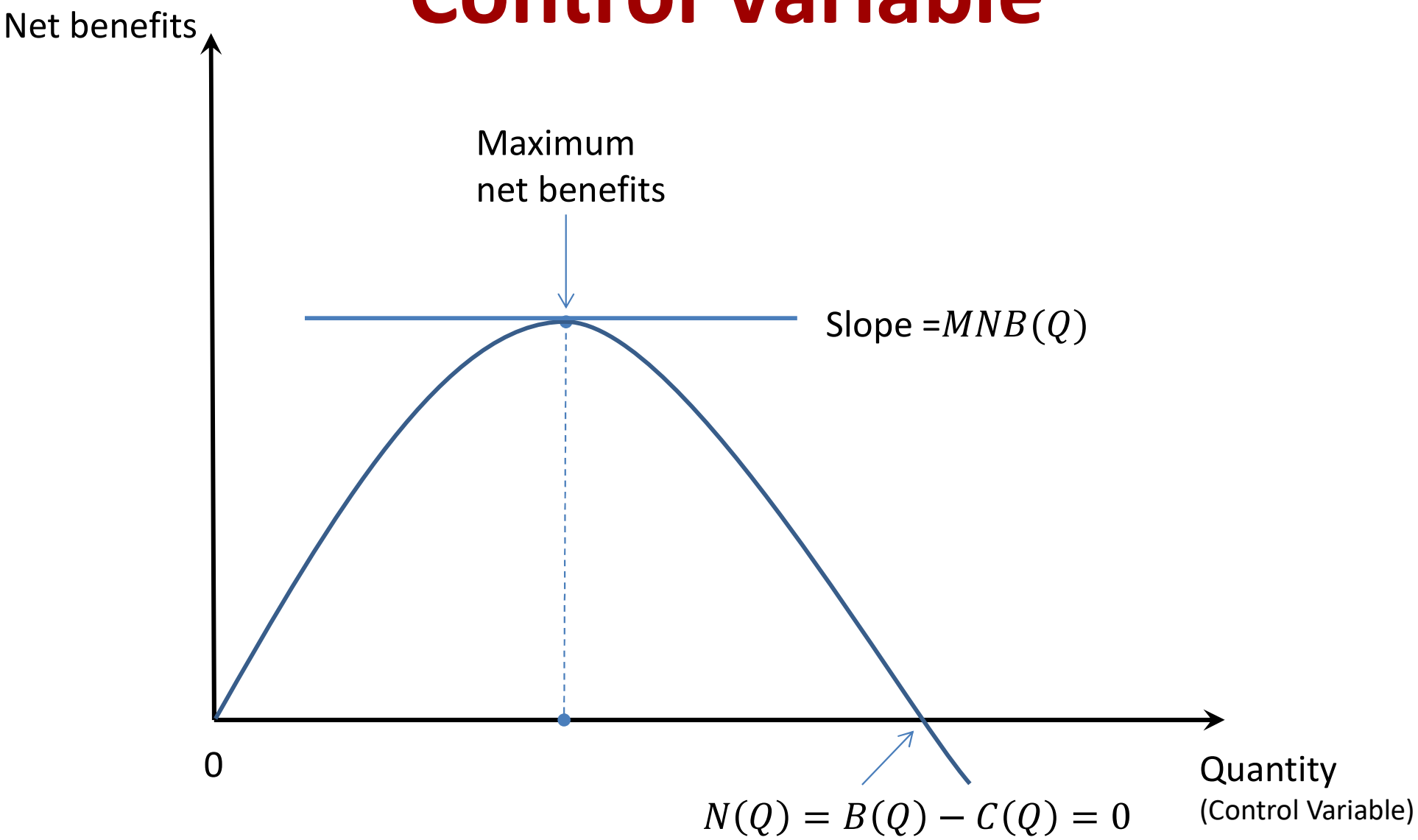

Marginal Value Curves Are the Slopes of Total Value Curves

- **A calculus alternative**
  - Slope of a continuous function is the derivative /marginal value of that function:

$$MB = \frac{dB(Q)}{dQ}$$

$$MC = \frac{dC(Q)}{dQ}$$

$$MNB = \frac{dN(Q)}{dQ}$$

Incremental Decisions

- **Incremental revenues**
  - The additional revenues that stem from a yes-or-no decision.
- **Incremental costs**
  - The additional costs that stem from a yes-or-no decision.
- "Thumbs up" decision
  - $MB > MC$.
- "Thumbs down" decision
  - $MB < MC$.

Positive & Normative Analysis

- Positive Analysis – statements that describe the relationship of cause and effect
  - Questions that deal with explanation and prediction
    - What will be the impact of an import quota on foreign cars?
    - What will be the impact of an increase in the gasoline excise tax?

Positive & Normative Analysis

- Normative Analysis – analysis examining questions of what ought to be
  - Often supplemented by value judgments
    - Should the government impose a larger gasoline tax?
    - Should the government decrease the tariffs on imported cars?

Discussion

- A kidney market?

The New York Times

Auction for a Kidney Pops Up on Ebay's Site

Share full article

By Amy Harmon

Sept. 3, 1999

Bidding for a human kidney, described on the Internet auction site Ebay as "fully functional," began at $25,000 and reached $5,750,100 before the company abruptly ended the auction yesterday afternoon.

Take-home messages

- Make sure you include all costs and benefits when making decisions (**opportunity costs**).
- When decisions span time, make sure you are comparing apples to apples (**present value analysis**).
- Optimal economic decisions are made at the margin (**marginal analysis**).