Intermediate Microeconomics Exercise Class 7

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Homework 2

When the price of Fiori falls and the substitution effect is in a negative direction, then Fiori is a(an)

- luxury good.
- inferior good.
- Giffen good.
- **None of the above is necessarily correct, and the substitution effect should always be in a positive direction in this case.**

Homework 2

Fiori's preferences can be represented by a utility function

$$U(x, y) = \min\{x, y\}$$

He faces prices of (2, 1), and his income is 12. Then the prices change to (3, 1). What are the compensating and equivalent variations?

- 3, 3
- 3, 4
- 4, 4
- **4, 3**

Homework 2

Fiori uses two factors of production. Irrespective of how much of each factor is used, both factors always have positive marginal products, which imply that

- isoquants are relevant only in the long-run.
- **isoquants have negative slope.**
- isoquants are convex.
- isoquants can become vertical or horizontal.
- None of the above.

Homework 2

In order for a taxicab to be operated in New York City, it must have a medallion on its hood. The medallion is expensive, but can be resold, and is therefore

- **a fixed cost.**
- a variable cost.
- an opportunity cost.
- a sunk cost.

Homework 2

Suppose that Fiori faces a production function of $f(x_1, x_2) = 3x_1 + x_2$. If the factor prices are 9 for Factor 1 and 4 for Factor 2, how much will it cost him to produce 50 units of output?

- **150**
- 175
- 200
- 875
- 1550

Homework 2

Suppose Fiori uses labor and capital to produce brownies and the production exhibits constant returns to scale. Meanwhile, the real rental and the real wage are both constant. In this case, Fiori has made the optimal choice to maximize his profit, given $K, L > 0$.

- If Fiori faces a standard Cobb-Douglas production function of $P(K, L) = K^{\alpha} L^{1-\alpha}$, prove that Fiori earns no profit.
- Prove that Fiori earns no profit in general.

Homework 2

Suppose Thompson owns a factory of producing Fiori and faces a production function of

$$f(K, L) = \sqrt{KL}$$

where K and L do not have to be integers. Currently, the wage and rent are both \$1 and Thompson needs to produce 10 units of Fiori. Meanwhile, there is an extra cost to alter the amount of capital used in production, and additional $\$x$ is required for each unit of capital deviated from $K = 5$, which was the former optimal level of capital used.

- Suppose $x = 1$. Figure out the optimal production choice for Thompson and the associated cost.
- When x decreases to 0, is the situation closer to a short-run case where the capital is fixed at 5 or to a long-run case?

Homework 2

Profiteer Thompson operates a brownie factory. This year, he faces a cost of $C = 20 * Q$ and a demand of $Q = 100 - P$.

- Figure out the optimal quantity to produce, the price of brownies and profit gained by Thompson.
- Thompson decides to operate for at least two years. Instead of maximizing a one-year profit, he intends to maximize the profit of two consecutive years in total. Suppose his cost remains the same for the following year, but the demand changes to $Q = 200 - P_1 - P_2$, where P_1 is the price of brownies for this year and P_2 is the price for the following year. Figure out the optimal quantities and prices for both years and the total profit earned.

Revenue and Profit

- Revenue
  - Total Revenue
  - Average Revenue
  - Marginal Revenue$=\frac{dTR}{dQ}$

Revenue and Profit Cont'd

- Profit
  - Accounting Profit = Total Revenue − Accounting Cost
  - Economic Profit = Total Revenue − Economic Cost = Accounting Profit − The Value of Opportunity Cost
- $\Pi(Q) = (P - AC)Q$
- Profit Maximization: $MR = MC$

Revenue and Profit Cont'd

- Short-Run Profit Maximization
- $\max_{x_1} pf(x_1, \bar{x}_2) - \omega_1 x_1 - \omega_2 \bar{x}_2$
- $pMP_1(x_1^*, \bar{x}_2) = \omega_1$

Revenue and Profit Cont'd

- Long-Run Profit Maximization
- $\max_{x_1,x_2} pf(x_1, x_2) - \omega_1 x_1 - \omega_2 x_2$
- $pMP_1(x_1^*, x_2^*) = \omega_1$
- $pMP_2(x_1^*, x_2^*) = \omega_2$

Revenue and Profit Cont'd

- Welfare Economics
  - Consumer Surplus
  - Willingness to Pay (WTP)
  - Producer Surplus
  - Willingness to Sell (WTS)
  - Total Surplus (TS)

Different Forms of Market

- Perfect Competition
- A perfectly competitive firm is a price taker
- $MR = P$
- Shape of the Demand Curve for a Perfectly Competitive Firm – Horizontal (perfectly elastic)

Perfect Competition

- Profit Maximization in the Short-Run: $MC = MR = P$
- In the Long-Run: $P = MC$
  - $\pi > 0$: Entry of new firms
  - $\pi < 0$: Exit of existing firms
  - $\pi = 0$: No firms enter or leave the market $\Rightarrow$ Perfectly competitive equilibrium
- $P = MC = MR = AC_{\text{min}}$

Perfect Competition Cont'd

- Long-Run Supply Curve of a Perfectly Competitive Market (LRS)
  - Constant Cost Industry – Firms in the industry can buy as much inputs as needed without causing the input prices to go up
  - Increasing Cost Industry – Increasing purchases of inputs causes input prices to go up

Monopoly

- Single seller of a good with no close substitutes
- Sources of Monopoly Power
  - Economies of Scale (Natural Monopoly)
  - Economies of Scope (Cost Complementarities)
  - Barriers to Entry
- While the perfectly competitive firm is a "price taker", the monopolist is a "price maker"

Monopoly Cont'd

- Demand Curve of a Monopolist: downward-sloping demand curve
- $MR < P$
- $MR = P + Q\frac{dP}{dQ}$

Monopoly Cont'd

- Profit Maximization by a Monopolist
  - Look for where $MR = MC$ to determine the quantity supplied Q^*
  - To find the price P^* that the monopolist charges, use the point on the demand curve where the quantity is equal to Q^*
  - Profit-maximization under monopoly: $MR = MC < P$
- Rule of Thumb for Monopoly: $MR = MC \Rightarrow Q^*$

Monopoly Cont'd

- Monopoly Power – The ability to charge a price higher than MC (control of price)
- $MR = P + P\frac{1}{E^D}$
- $P = \frac{MC}{1-\frac{1}{|E^D|}}$

Monopoly Cont'd

- A monopolist will never choose to operate where the demand curve is inelastic
- $MR = P + P\frac{1}{E^D}$
- In a perfectly competitive market, the firm faces a flat demand curve
- Markup Pricing: $\frac{1}{1-\frac{1}{|E^D|}} > 1$

Thanks!