Intermediate Microeconomics

Chapter 25: Monopoly

Instructor: Ziyang Chen

Econ Department, Business School, Nanjing University

Monopoly

Suppose that the monopolist seeks to maximize its economic profit,

$$\max p(\underline{q})\,\underline{q} - c(\underline{q})$$

What output level $\underline{q}^*$ maximizes profit?

FOC (MR=MC): $p'\left(\underline{q}\right)\underline{q} + p\left(\underline{q}\right) = c'\left(\underline{q}\right) \Rightarrow ?$

Marginal Revenue and Marginal Cost

Marginal revenue is the rate-of-change of revenue $p(\underline{q})\underline{q}$ as the output level $\underline{q}$ increases;

$$\mathrm{MR}\left(\underline{q}\right) = p'\left(\underline{q}\right)\underline{q} + p\left(\underline{q}\right)$$

Marginal cost is the rate-of-change of total cost as the output level y increases;

$$\mathrm{MC}\left(\underline{q}\right) = \mathrm{c}'\left(\underline{q}\right)$$

$p(q) = a - bq$.

$MR = \frac{dPq}{dq} = a - 2bq$.

$MC = \alpha + 2\beta q$.

An example, if $p\left(\underline{q}\right) = a - b\underline{q},\ c\left(\underline{q}\right) = F + \alpha\underline{q} + \beta\underline{q}^2$, maximize profits

FOC: $\hookrightarrow MR = MC$. $\boxed{q = \frac{a-\alpha}{2(b+\beta)}}$

$\Rightarrow a - 2bq = \alpha + 2\beta q$

$q^* = ?$

$p^* = ?$

$p = a - \frac{b(a-\alpha)}{2(b+\beta)}$

Monopolistic Pricing

For a profit maximization: $\mathrm{MR} = p(\underline{q})[1+\frac{1}{\varepsilon}] = \mathrm{MC}$

ε很大，完全竞争

$$\Rightarrow p\left(\underline{q}\right) = \frac{\varepsilon}{\varepsilon+1}\mathrm{MC}\ \text{(monopolist's price)}$$

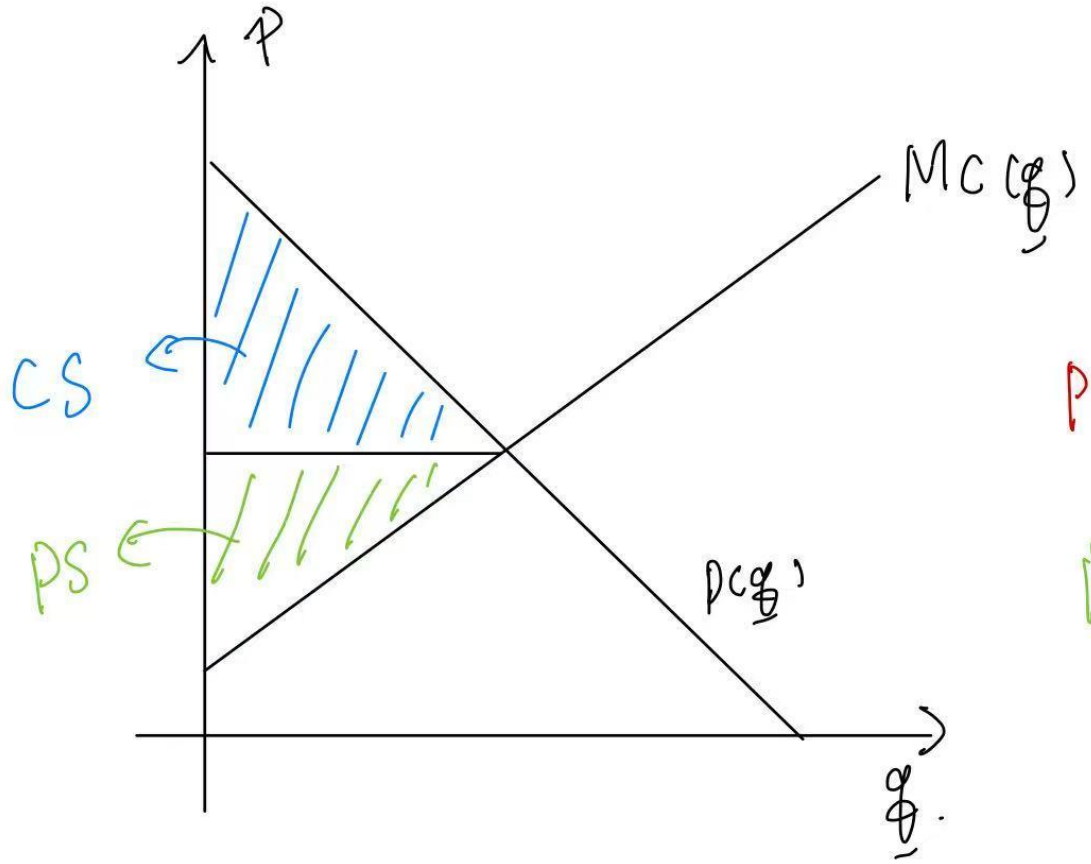
$$\Rightarrow p\left(\underline{q}\right) - \mathrm{MC} = \frac{-1}{\varepsilon+1}\mathrm{MC}\ \text{(Markup)}$$

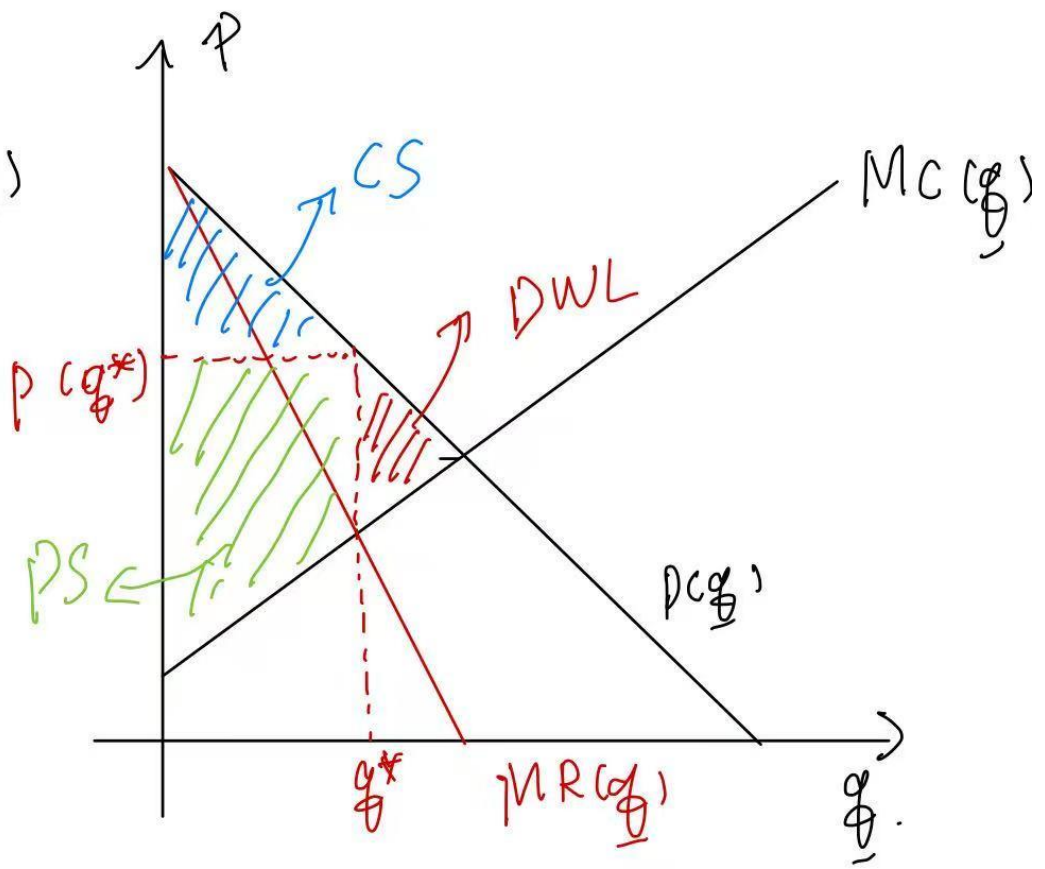
$$\Rightarrow \mathcal{L} = \frac{p\left(\underline{q}\right)-\mathrm{MC}}{\mathrm{MC}} = \frac{-1}{\varepsilon+1}\ \text{(Lerner Index)}$$

垄断的指数

↳ to measure market power

Inefficiency of Monopoly





A Profits Tax Levied on a Monopoly

A profits tax levied at rate t reduces profit from $\pi(q^*)$ to $(1\text{-}t)\pi(q^*)$.

Q: How is after-tax profit, $(1\text{-}t)\pi(q^*)$, maximized?

A: By maximizing before-tax profit, $\pi(q^*)$

So a profits tax has no effect on the monopolist's choices of output level, output price, or demands for inputs.

I.e. the profits tax is a neutral tax.

Quantity Tax Levied on a Monopolist

A quantity tax of $t/output unit raises the marginal cost of production by $t.

So the tax reduces the profit-maximizing output level, causes the market price to rise, and input demands to fall.

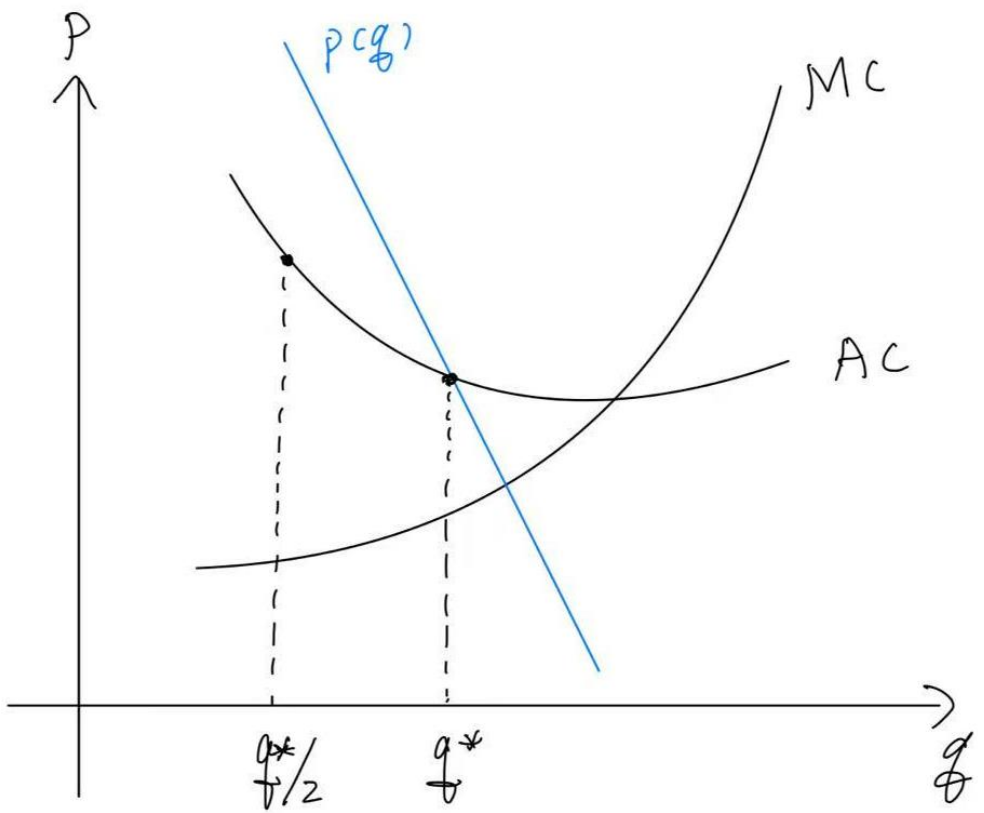
The quantity tax is distortionary（扭曲）.

Natural Monopoly

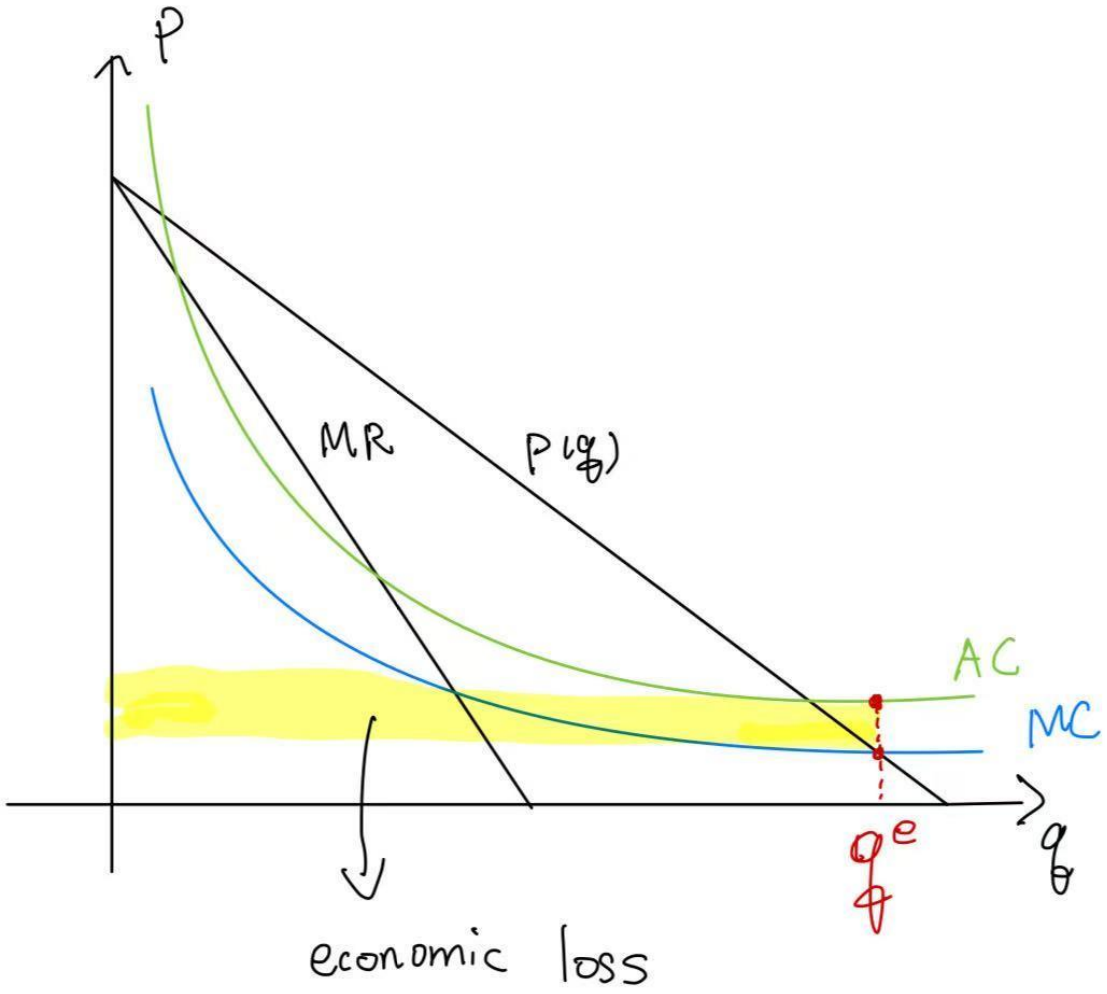
A natural monopoly arises when the firm's technology has economies-of-scale large enough for it to supply the whole market at a lower average total production cost than is possible with more than one firm in the market.

Cases:

Water, electricity, and gas industries.



Regulating a Natural Monopoly



At the efficient output level q^e, $\mathrm{AC}(q^e) > \mathrm{p}(q^e)$ so the firm makes an economic loss.

So a natural monopoly cannot be forced to use marginal cost pricing. Doing so makes the firm exit, destroying both the market and any gains-to-trade.

Regulatory schemes can induce the natural monopolist to produce the efficient output level without exiting.

Intermediate Microeconomics

Chapter 26: Monopoly Behavior

Instructor: Ziyang Chen

Econ Department, Business School, Nanjing University

How Should a Monopoly Price?

So far a monopoly has been thought of as a firm which has to sell its product at the same price to every customer. This is uniform pricing.

Can price-discrimination （差别定价）earn a monopoly higher profits?

First-degree Price Discrimination

Each output unit is sold at a different price. Price may differ across buyers.

It requires that the monopolist can discover the buyer with the highest valuation of its product, the buyer with the next highest valuation, and so on.

Second-degree Price Discrimination

Non-linear pricing

-Unit price depends on quantity purchased

-Bulk discount

Setting

-A seller does not know the willingness to pay by each individual buyer

-Consumer's marginal willingness to pay declines with quantity

Setting a uniform price is not optimal

-Too high a price would lose high volume consumer.

-Too low a price would lost revenue from low volume consumer.

-Coke example.

Mechanism： Set price for different volumes to let consumers identify themselves

Third-degree Price Discrimination

Price paid by buyers in a given group is the same for all units purchased. But price may differ across buyer groups.

Quality of goods is the same across groups.

Can identify groups but no further identification within that group.

A monopolist manipulates market price by altering the quantity of product supplied to that market.

So the question “What discriminatory prices will the monopolist set, one for each group?” is really the question “How many units of product will the monopolist supply to each group?”