



Chapter 8

Analysis of Perfectly Competitive Market

Outline

1. Supply Behavior of the Competitive Firm
 - 1.1 Features
 - 1.2 Demand Curve
 - 1.3 Output Decision Rules (Short-run)
2. Supply Behavior in Competitive Industries
 - 2.1 Market Supply
 - 2.2 Short-run v.s. Long-run
3. Special Cases of Competitive Market
4. Efficiency v.s. Equality



Outline

1. Supply Behavior of the Competitive Firm



1.1 Features of a Perfectly Competition Market

1. There are many sellers/firms (and buyers). They are “small” relative to the market.
2. Every firm produces homogenous (identical) product
3. Perfect information (Prices and quality of products are assumed to be known to all consumers and producers)
4. No transaction cost
5. Free entry and exit



Closed Examples

Village Fair



Zhongguan Cun



Unrealistic?

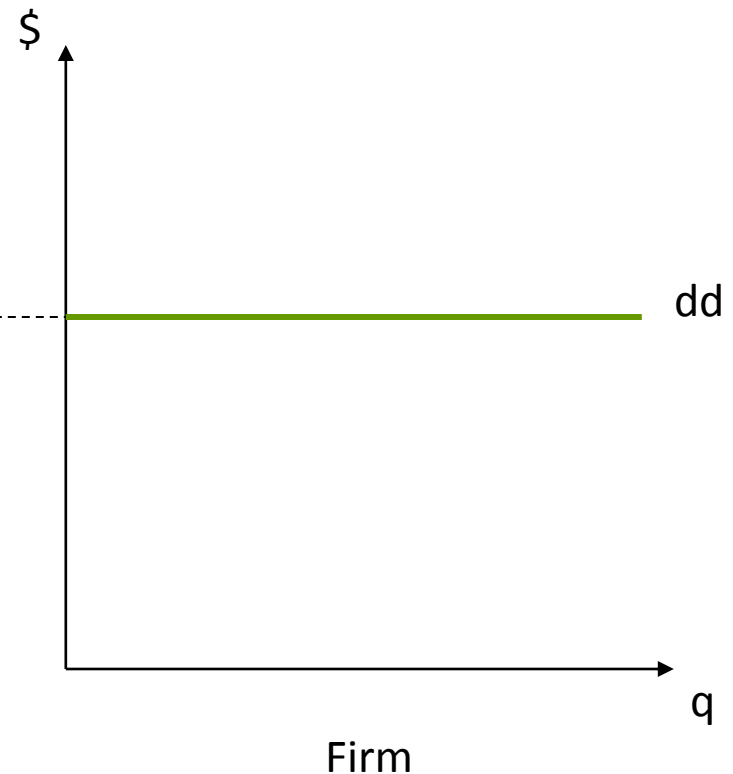
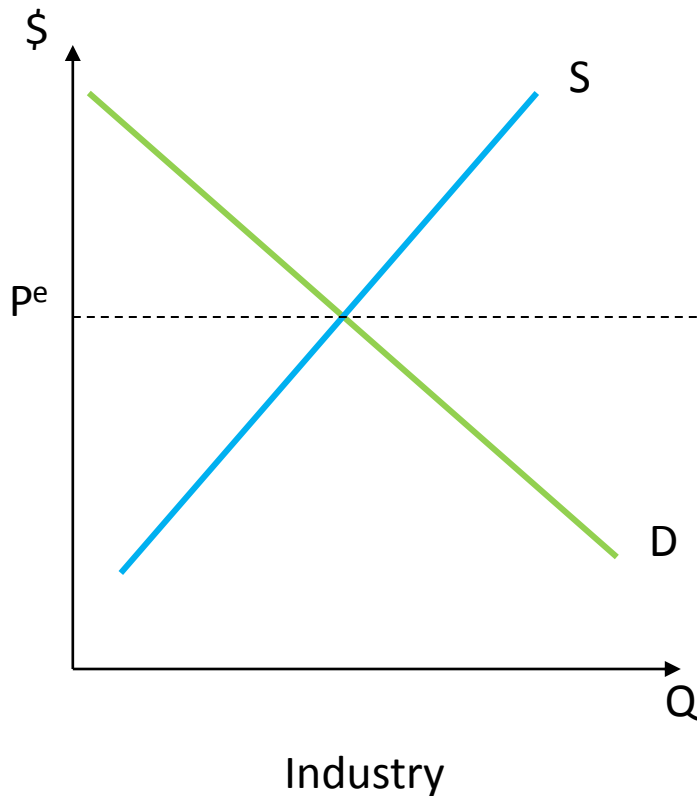


- Many small business are actually “price taker”. Their similar rule are closed to those in the perfectly competitive market
- The perfectly competitive is a “Benchmark” model of studying the market competition
 - For welfare analysis: Once we understand the market efficiency, we can then understand the importance of restricting market power
 - For managers: A price-taking firm can only maintain a minimum level of profit (product differentiation)



1.2 Demand Curve Faced by a Perfectly Competitive Firm

- The perfect competitive firm (price taker) faces a completely horizontal demand (or dd) curve
 - A perfectly elastic demand curve
 - Hypothetically, if the firm manage to sell the product a price lower than the competitive level (P_e), then it can take over the whole market
 - If the firm increase the price by a little bit, it will lose all its business



Objective of the Firm



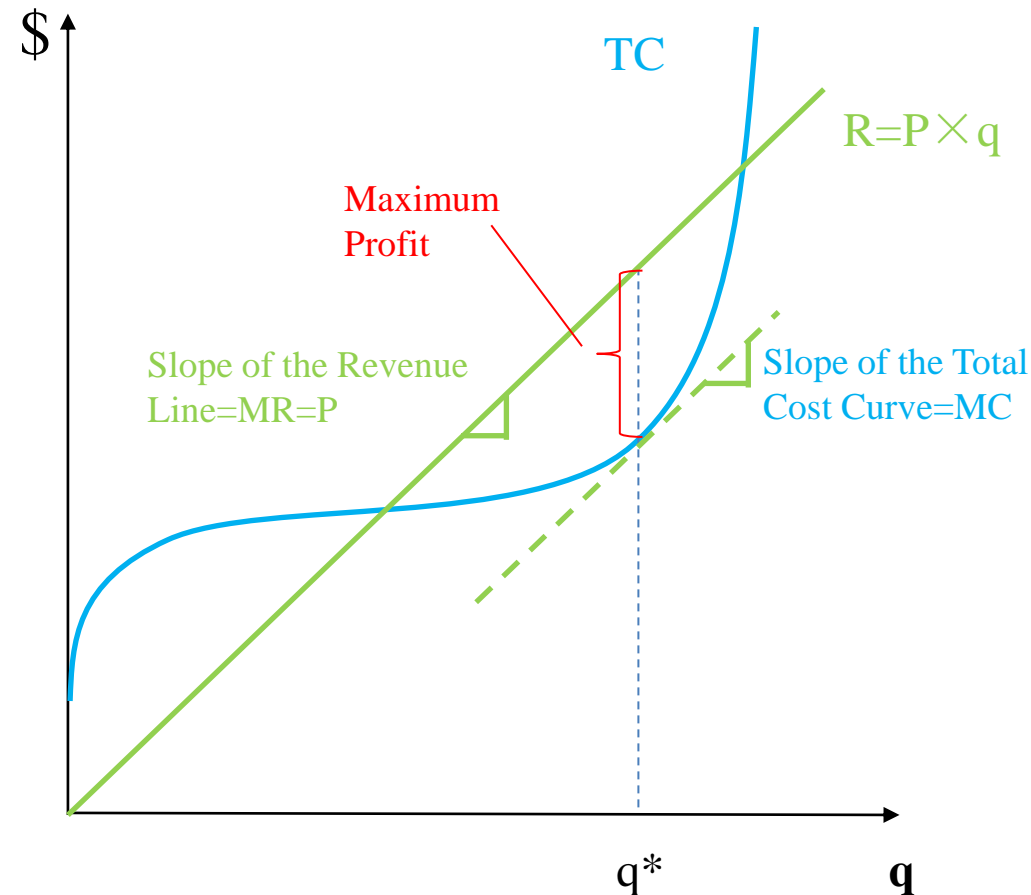
- Profit Maximization
 - Profit: net earning or take-home pay of a business
 - Firms maximize profits because that maximizes the economic benefit to the owners of the firm
 - Profit maximization requires the firm
 - To choose the optimal level of input and output
 - Make sure the output is produced efficiently (prevent waste, encourage worker morale, etc)



Cost and Production Schedule

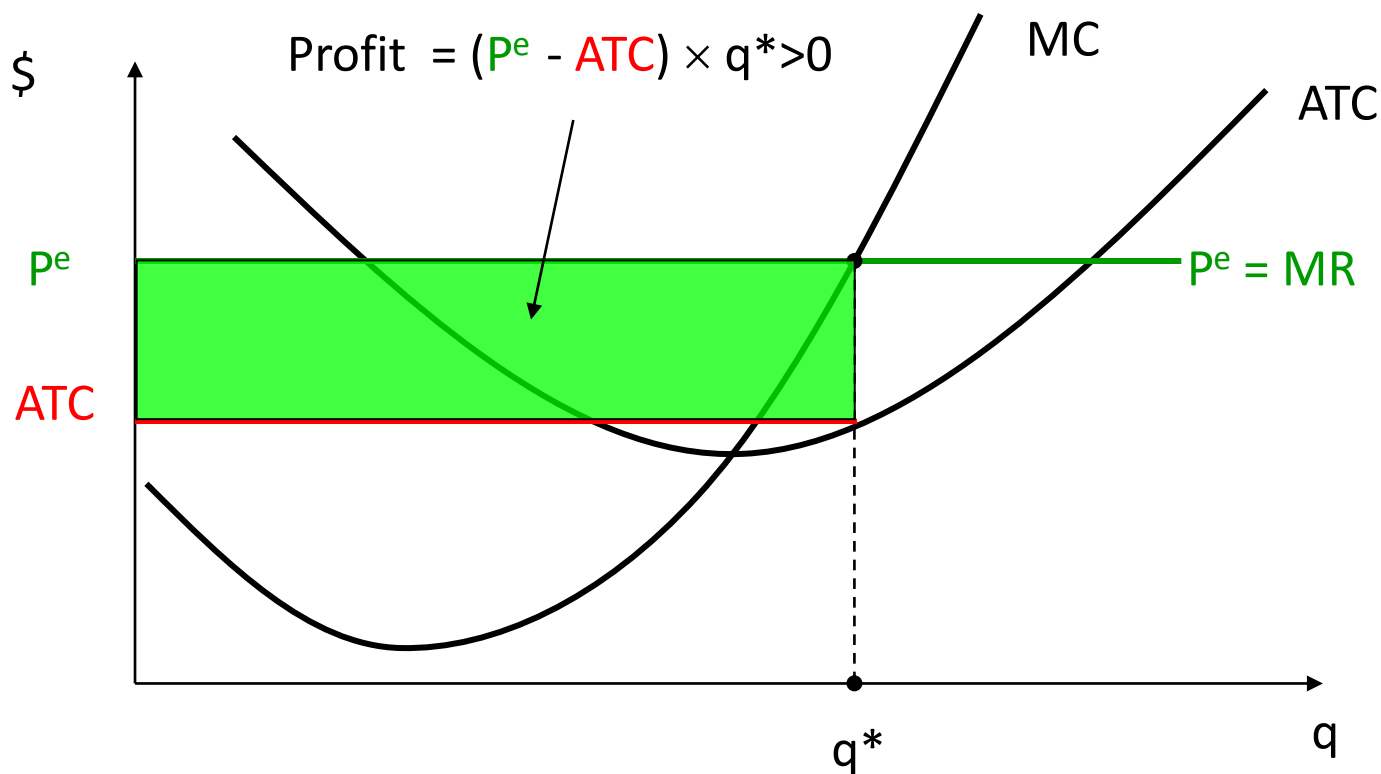
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Workers (L)	Output (q)	Marginal Output (MP= ΔQ)	Variable Cost (VC= $w \cdot L$)	ΔVC	Average Variable Cost (AVC=VC/q)	Marginal Cost (MC= $\Delta VC / \Delta Q$)
1	1	1	10	10	10	10
2	3	2	20	10	6.7	5
3	6	3	30	10	5	3.3
4	10	4	40	10	4	2.5
5	13	3	50	10	3.8	3.3
6	15	2	60	10	4	5
7	16	1	70	10	4.4	10
8	16	0	80	10	5	-

1.3 Output Decision (Short-run)

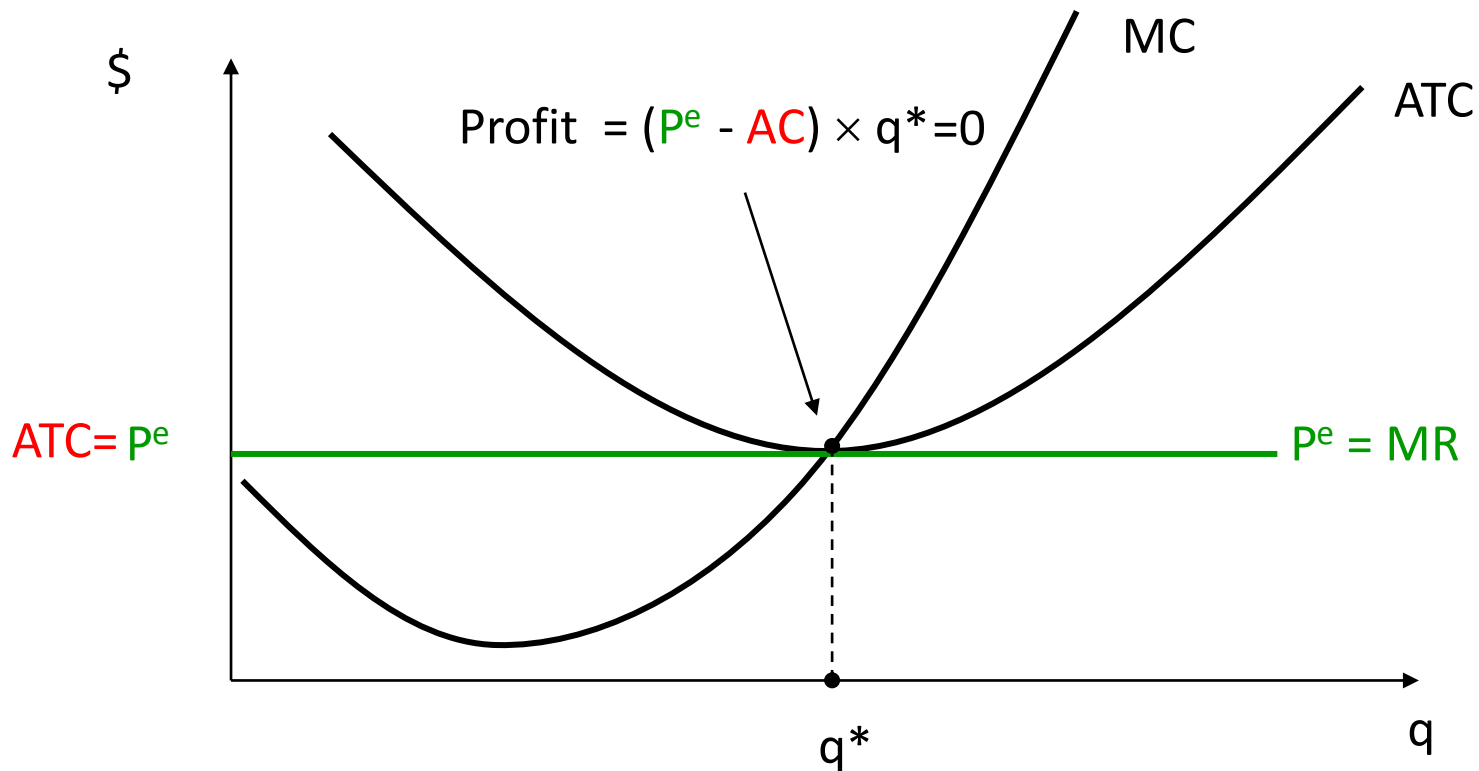


- Review of the total cost curve
- **Total Revenue:** $TR = P \times q$
- **Marginal Revenue (MR):** Change in revenue that is generated by an additional unit of sales
- For a price taking firm, $MR = P$
- Profit = $TR - TC$. For a given output, the vertical difference between R and TC is the profit
- Decision process in firm output
 - As long as $MR > MC$, increase in output leads to increase in profit
 - As output increases, MR stays the same; MC increases
 - When $q = q^*$, $MR = MC$, profit is maximized
 - With further increase in output, $MR < MC$, which decreases the profit
- **Optimal Decision Rule:** $MC = MR = P$

Cost Curves and Firm Profit

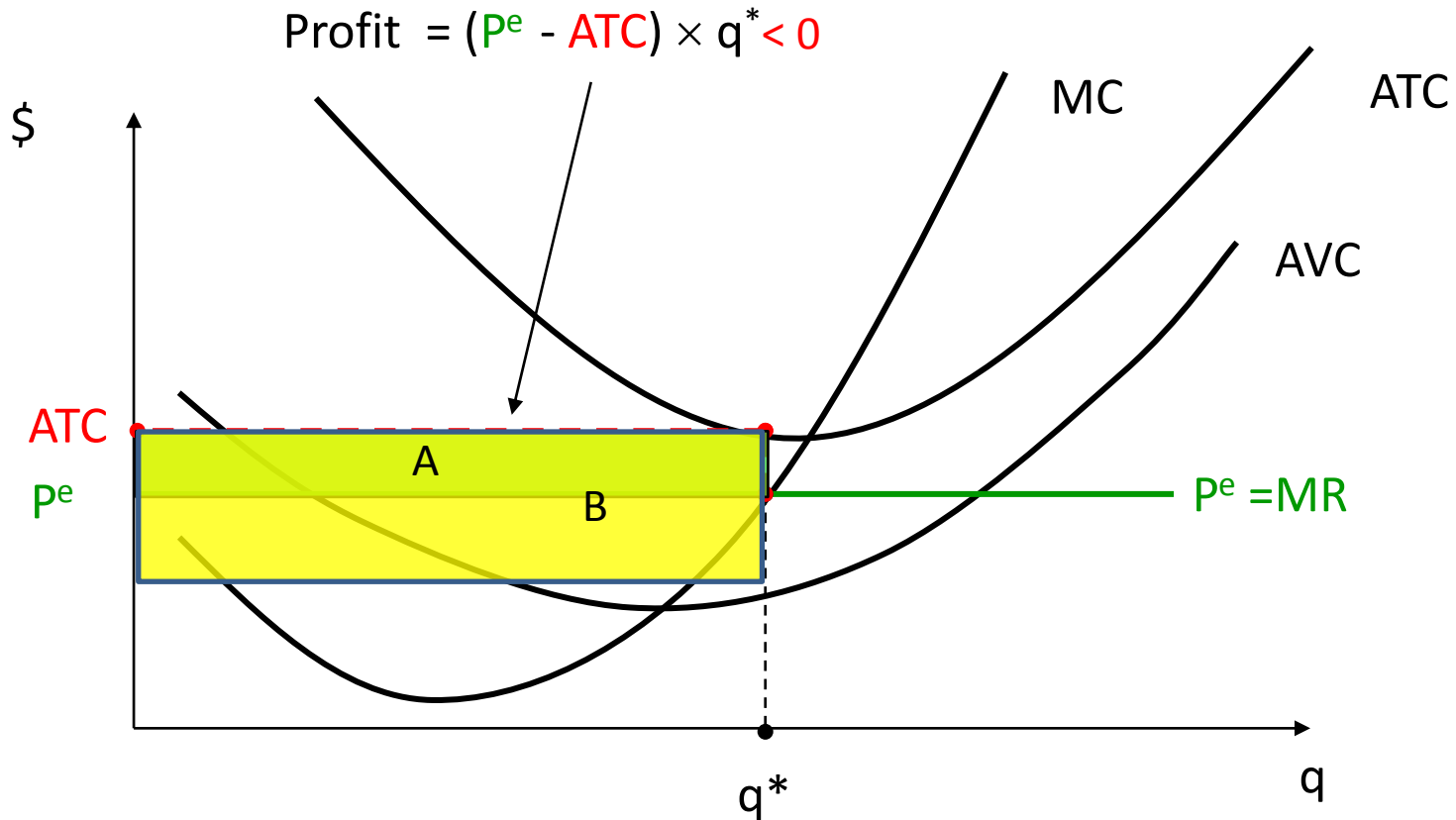


Zero-profit point



Loss Minimization

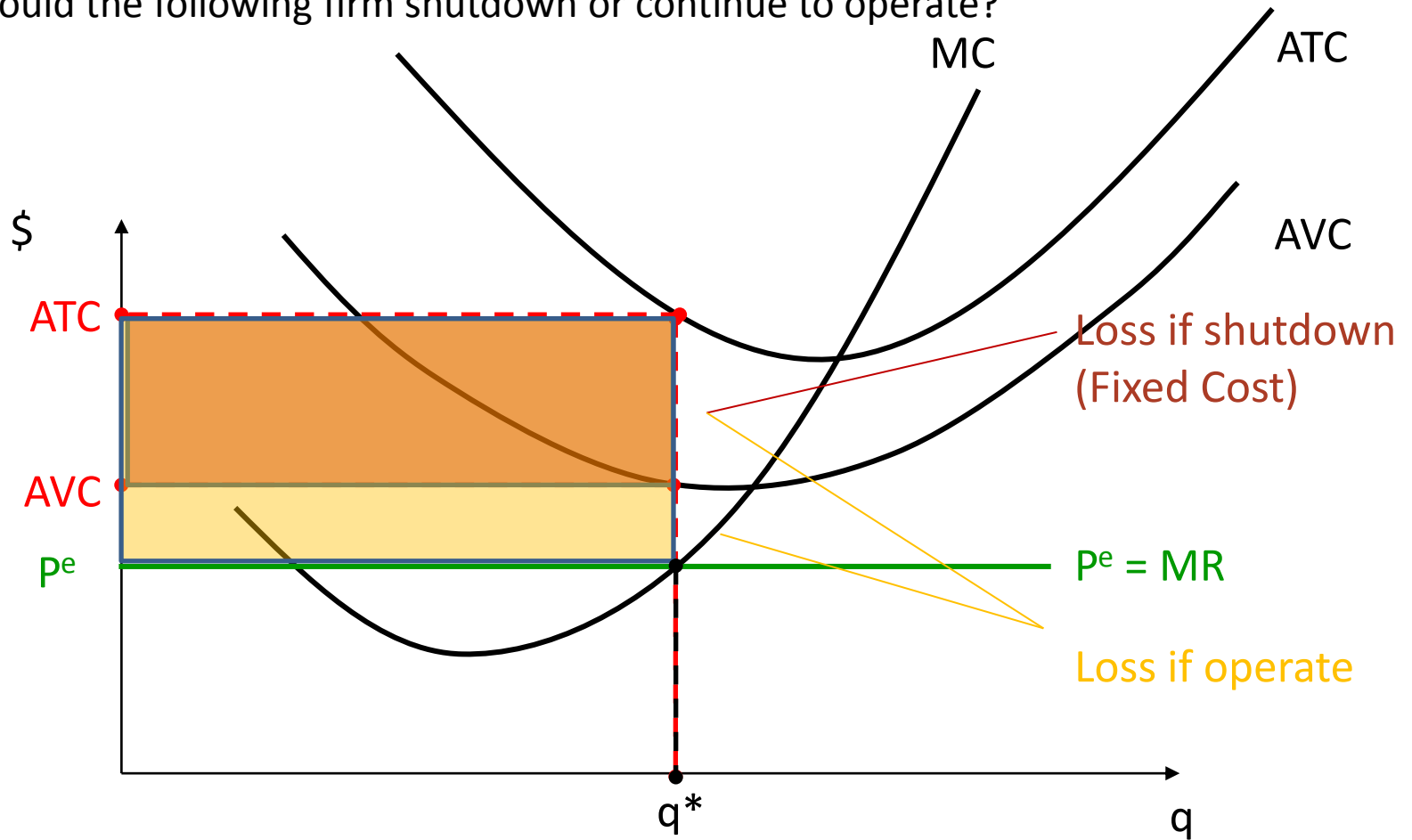
Should the following firm shutdown or continue to operate?



- If the firm continue to operate, it will suffer a loss of area A
- What is the firm's fixed cost? $FC = (ATC - AVC) \cdot q$
- If the firm shut down, it will suffer a loss of area B = fixed cost
- $A < B$: The firms should continue to operate in order to **minimize its loss**

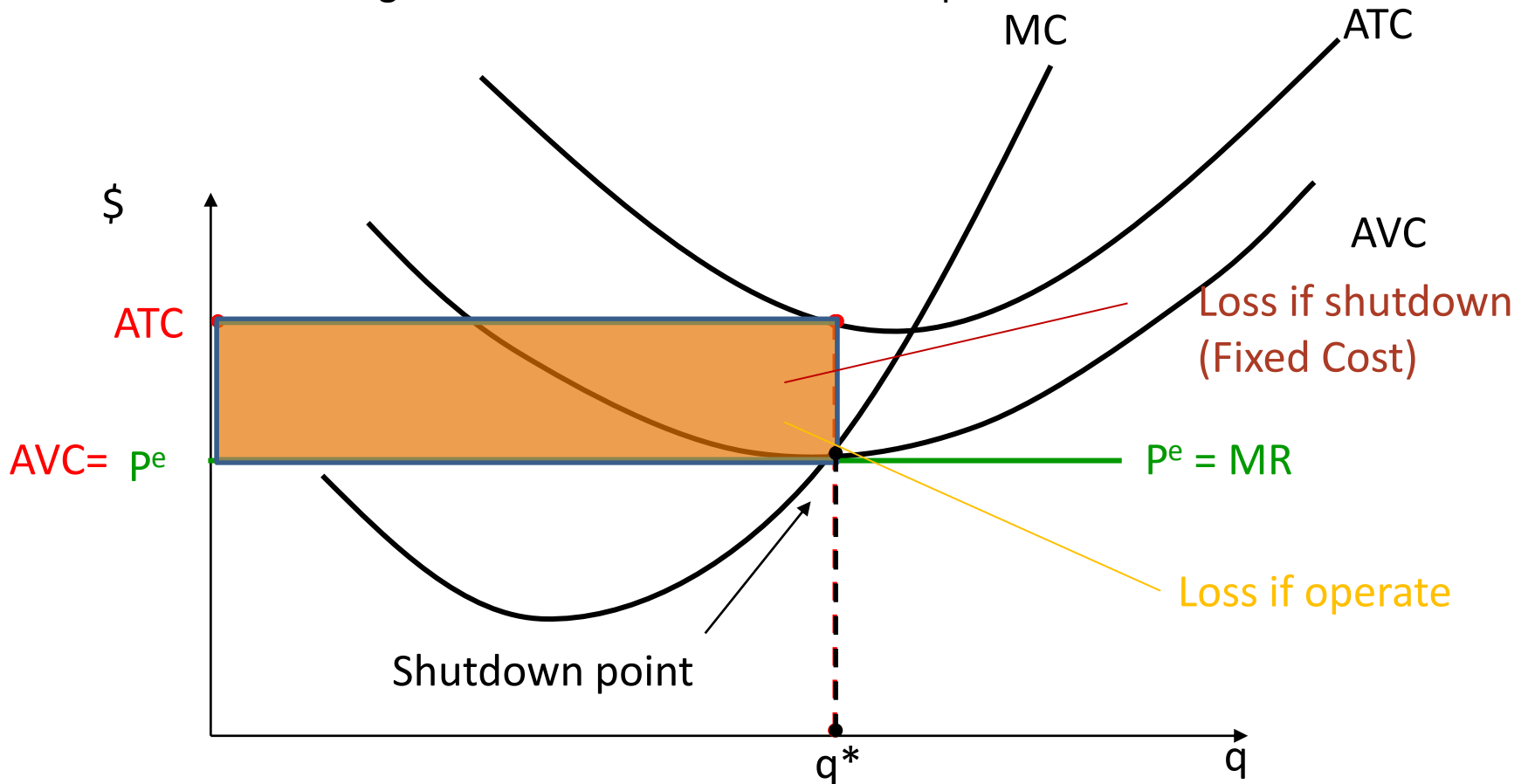
Shutdown Point (1)

Should the following firm shutdown or continue to operate?



Shutdown Point (2)

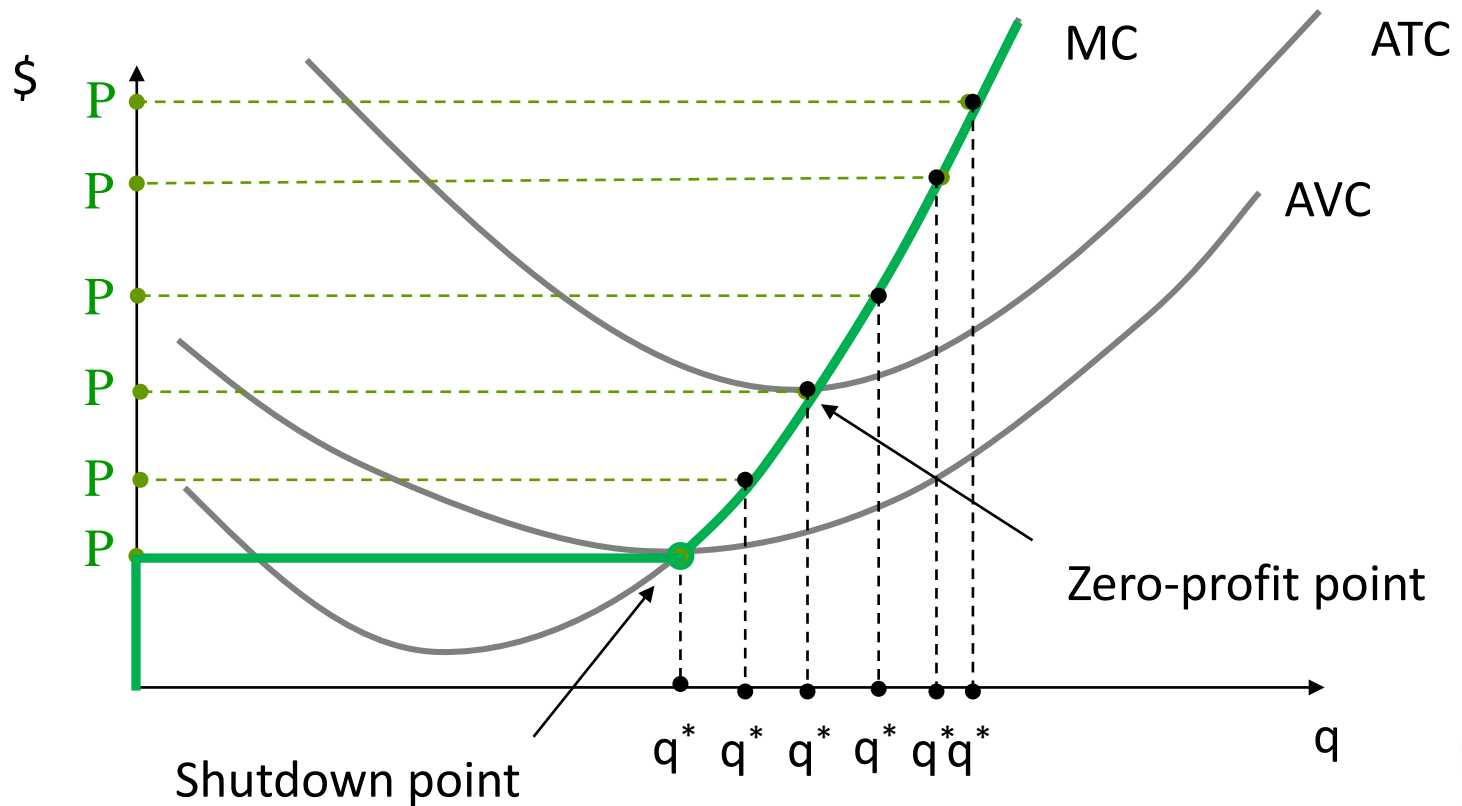
Should the following firm shutdown or continue to operate?



- The **shutdown point** comes where revenue just cover variable costs or where losses are equal to fixed cost
- **Shutdown Rule:** when price fall below average variable costs, the firm will maximize profits (minimizes its loss) by shutting down

Firm's Supply Curve

A firm's **supply curve** travels down the MC curve to the shutdown point (minimum AVC)



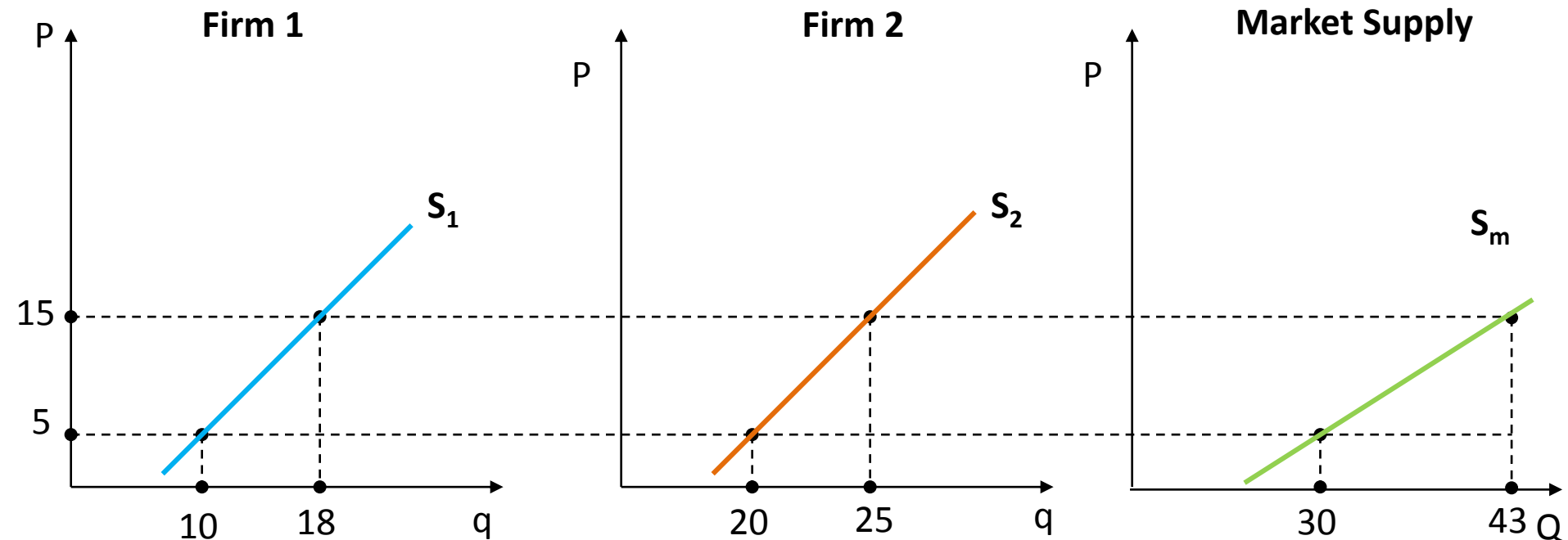
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2. Supply Behavior in Competitive Industries



2.1 Market Supply

- Total quantity brought to market at a given price will be the sum of the individual quantities that all firms supply at that price

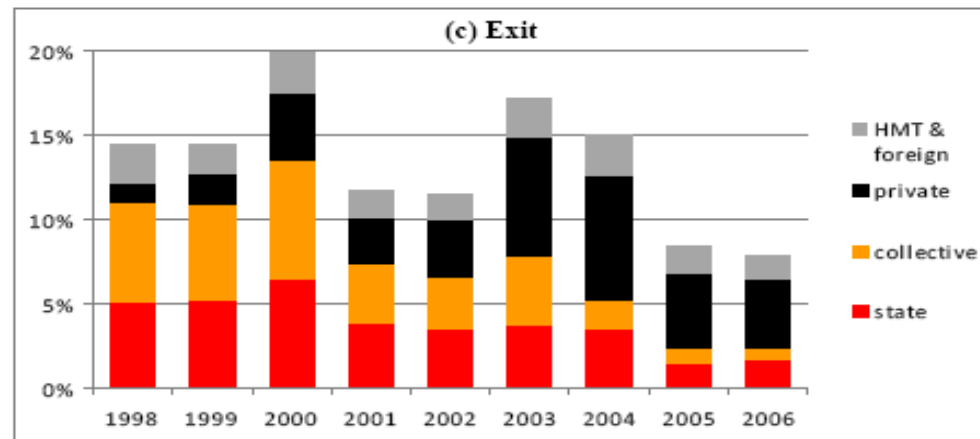
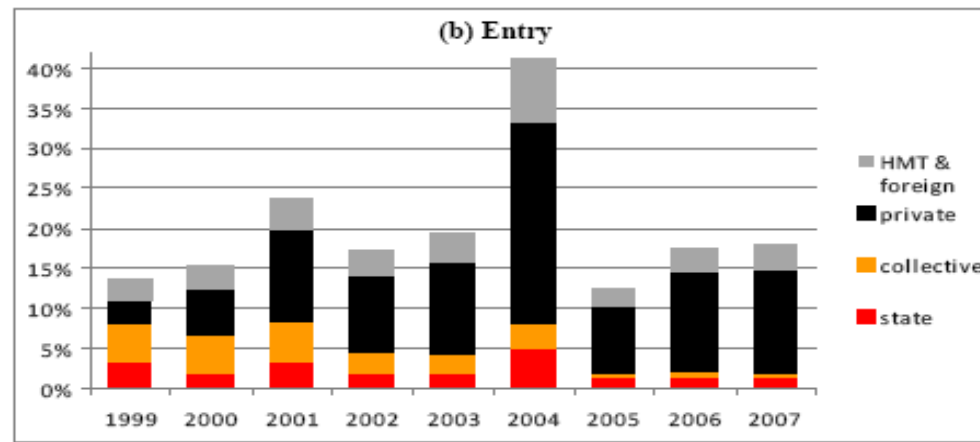
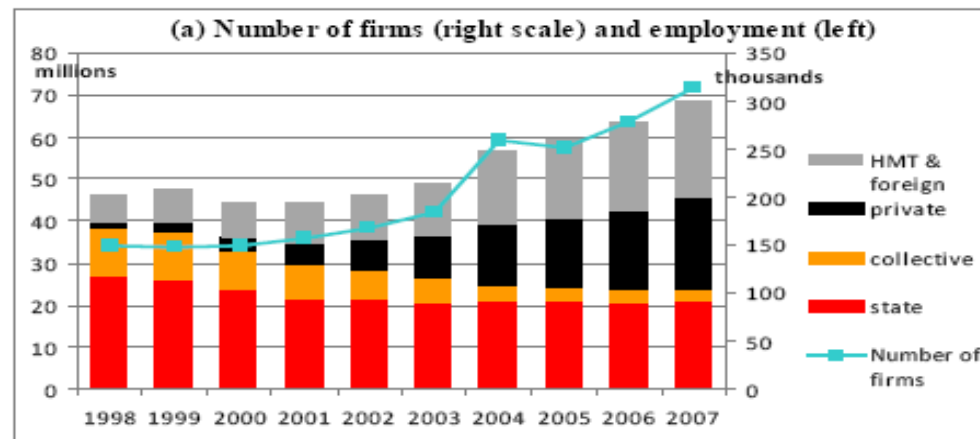


2.2 Short-run and Long-run Equilibrium

- Short-run equilibrium: Output changes must use the same fixed amount of capital
 - Fixed cost cannot be easily adjusted in the short-run
 - Firm can adjust other factor input such as labor in order to change its output level
- Long-run equilibrium: Capital and all other factors are variable and there is free entry and exit of firms into and from the industry

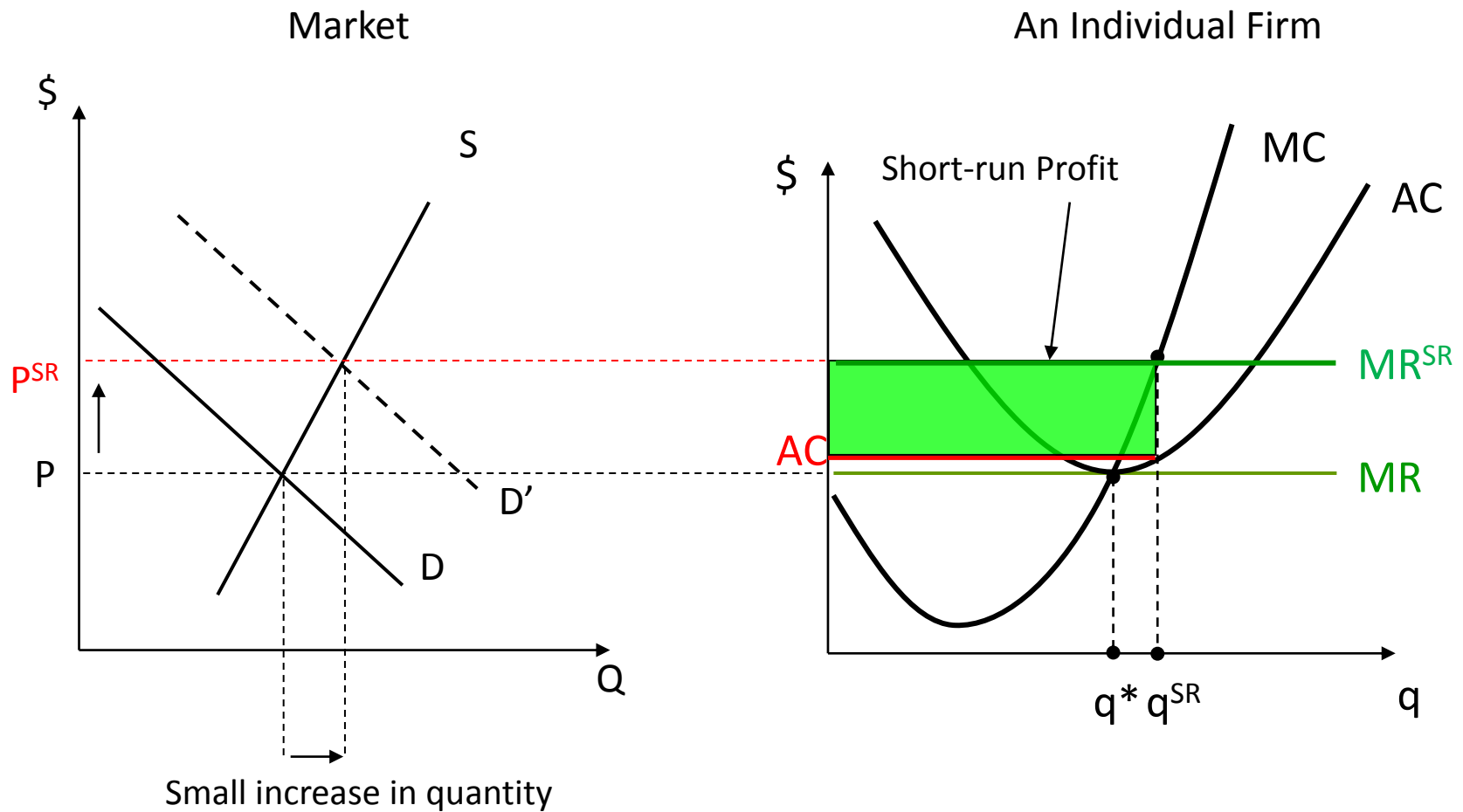
Entry and Exit by Categories among the Chinese Manufacturing Firms

- Five categories
- Change in # of firms
 - Net increase over time
 - Entry and exit account for about one-fifth
- Change in composition
 - Proportion of private and foreign firms increase significantly
 - From 2002 onwards, private firms make up more than 50% of all entrants
 - From 2005 onwards, they also make up 50% of all exiting firms



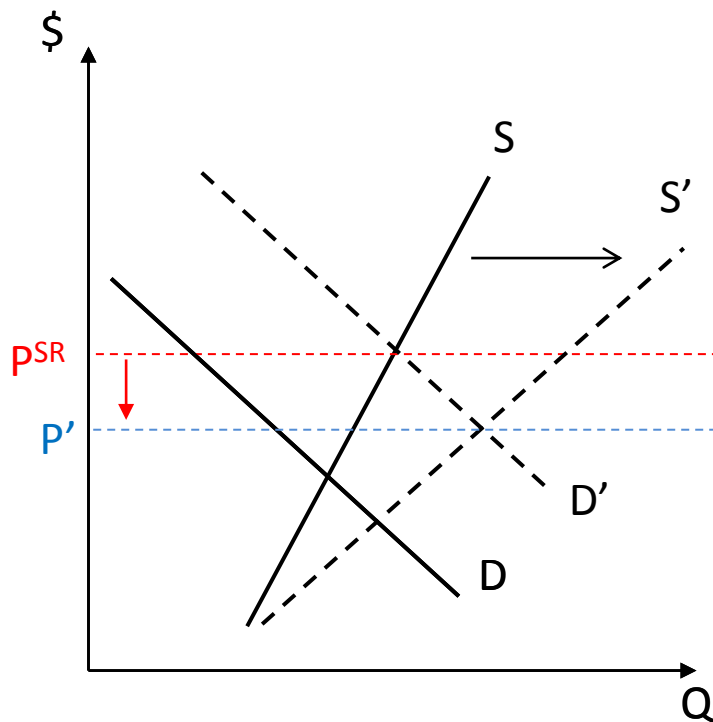
Source: Brandt, Van Biesebroeck, and Zhang, 2011.

An Illustration: Effects of a Positive Demand Shock

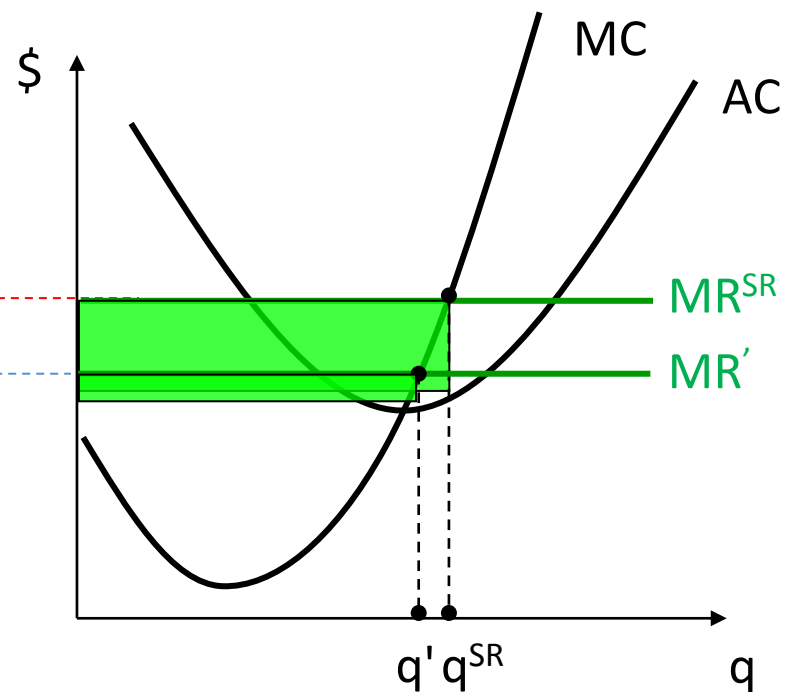


More Firms Enter the Market

Market

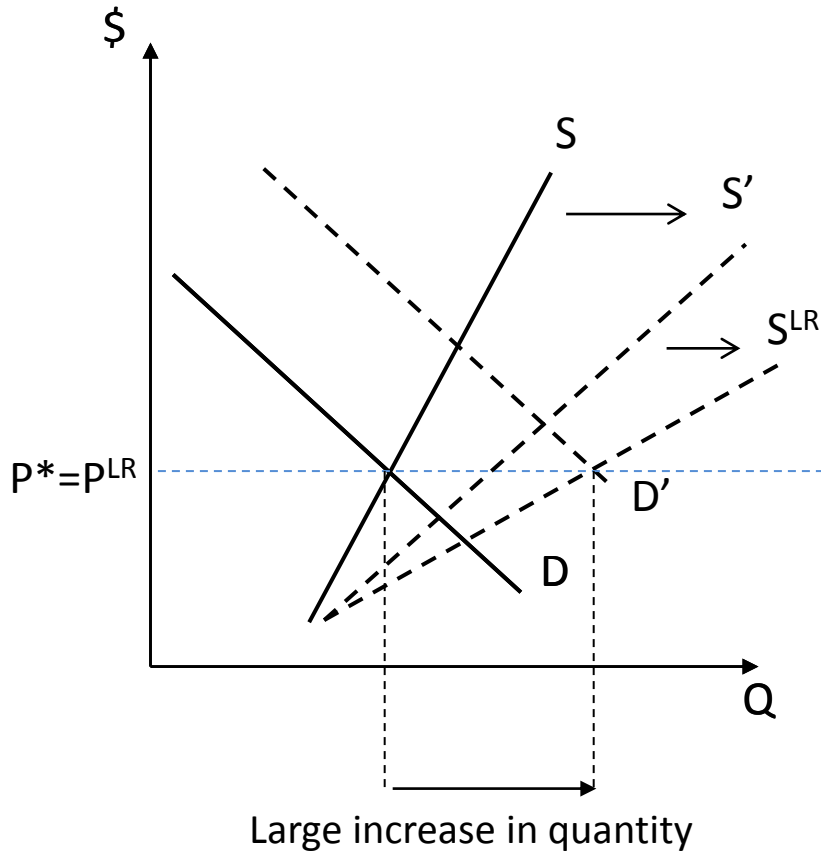


An Individual Firm

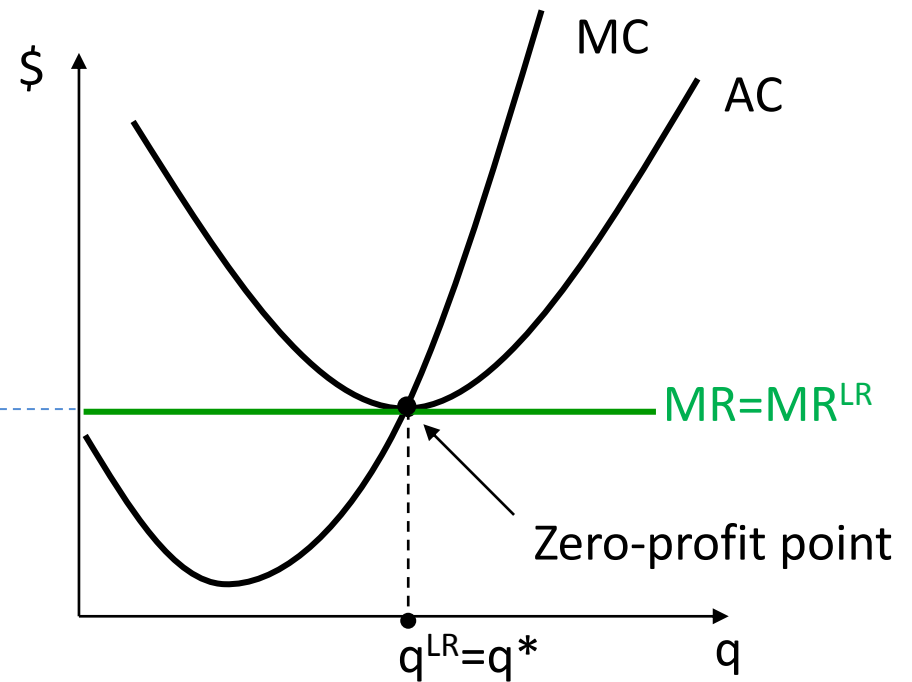


Long-run Equilibrium

Market



An Individual Firm



Summary

- Short-run positive profits induce more firms to enter
- Firms' entry lead to
 1. Increase in total supply
 2. Decrease in equilibrium price
 3. Decrease in individual firm's demand curve
 4. Decrease in profit (despite of the profit-maximization level decisions)
- No further entry when each individual firm in the market make zero profits

Zero-profit long-run equilibrium:

$P = MC = \text{minimum long-run AC} = \text{zero-profit price}$



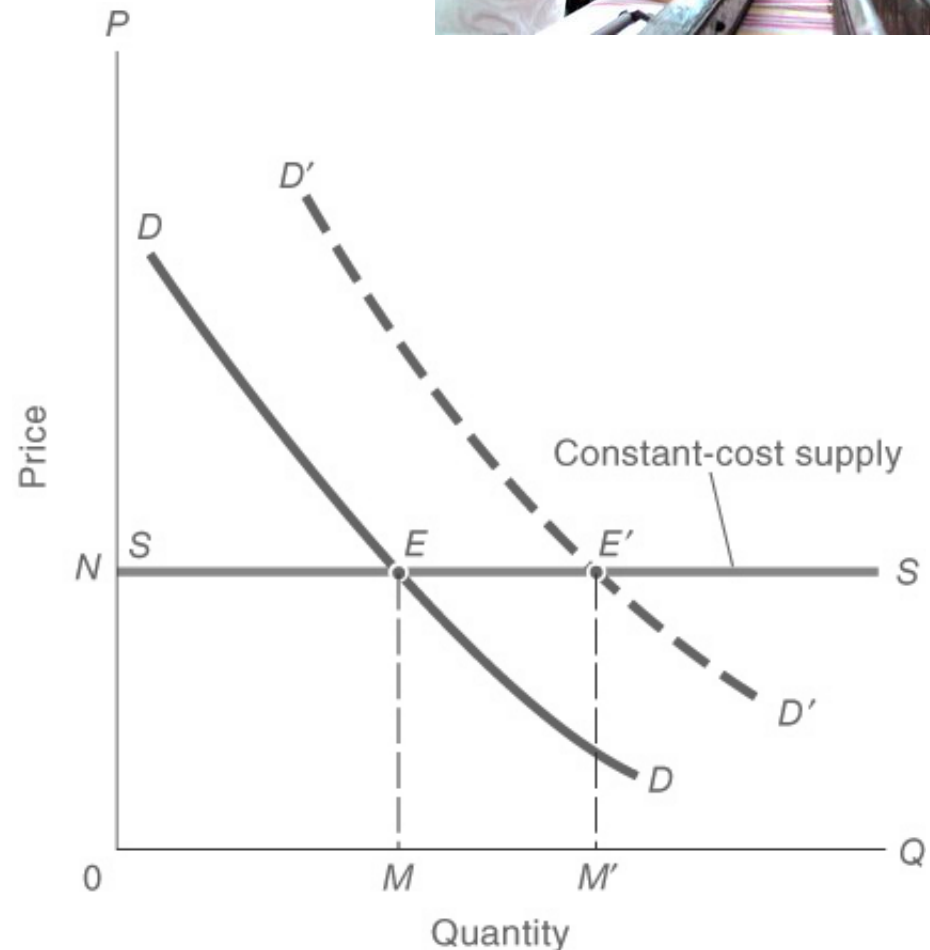
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3. **Special Cases of Competitive Market**



3.1 Constant Cost

- Production can be expanded by duplicating factor inputs (e.g. textile)
- Long-run supply curve is a horizontal line
- Perfectly elastic
- Increase in demand only increases the quantity, leaving the price unchanged



3.2 Fixed Supply

- Some goods or productive factors are completely fixed in amount, regardless of price.
- E.g., painting, natural Resources (Land), etc
- When supply is independent of price
 - The supply curve is a vertical line
 - Perfectly inelastic
 - Increase in demand leads to increase in price, but not quantity

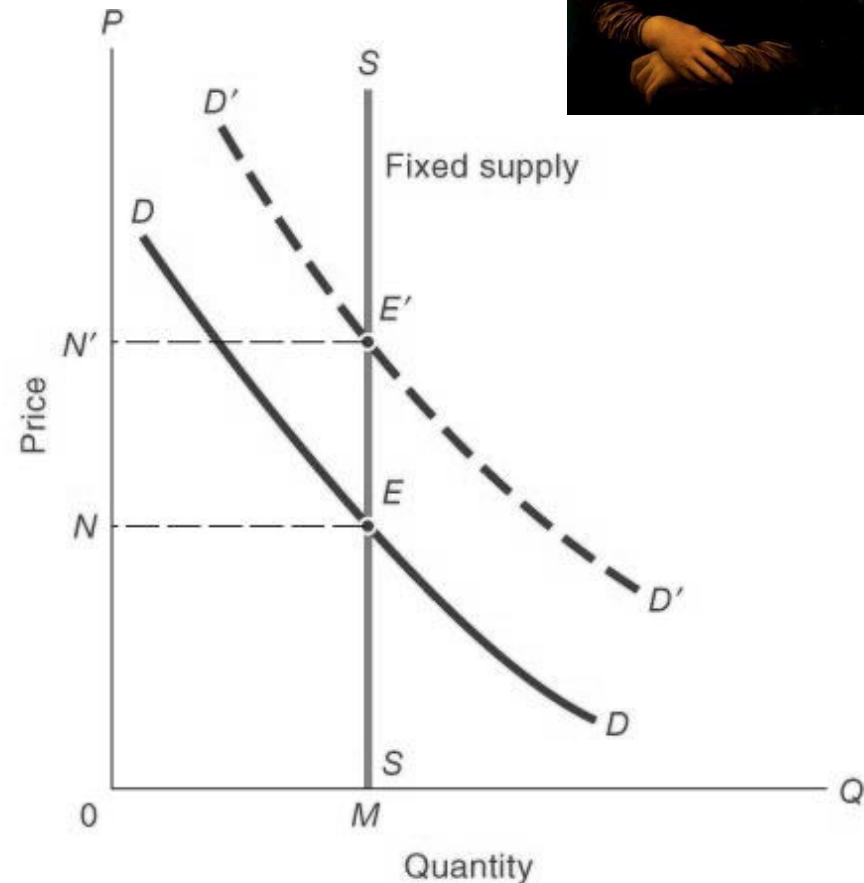
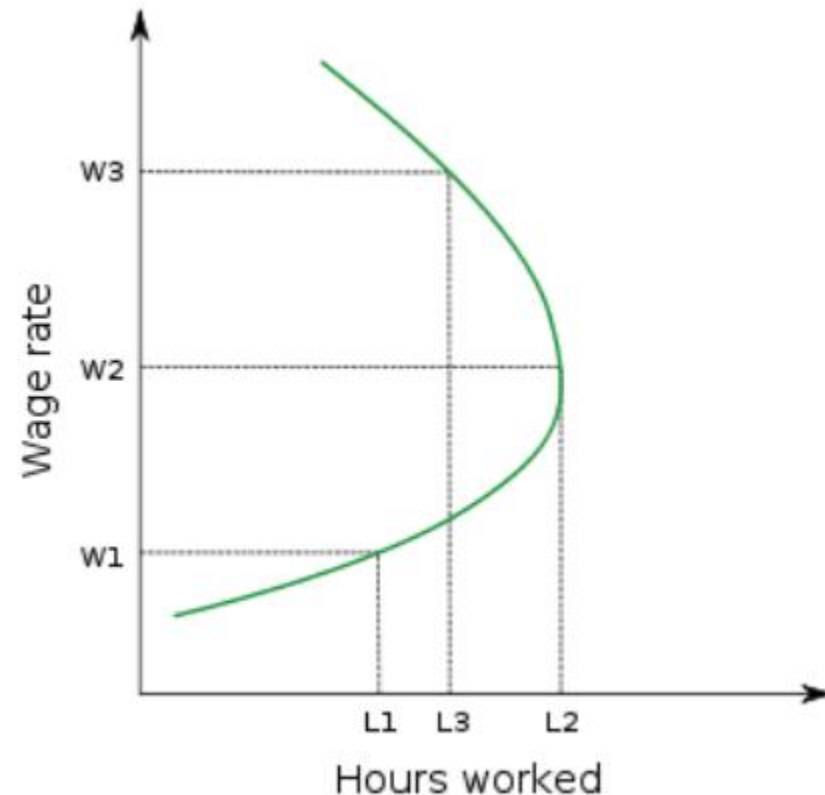


FIGURE 8-9. Factors with Fixed Supply Earn Rent



3.3 Backward-Bending Supply Curve

- In labor supply decision, agent being considered are individual workers
- Objective: maximize utility from consumption and leisure
- Constraint: time (24 hrs)
- Decision: allocate time between working and leisure
 - Benefit of working: increase consumption at wage rate w
 - Cost of leisure: wage rate
- As wage rate increases
 - Substitution effect: leisure becomes relatively more expensive \rightarrow consume less leisure \rightarrow increase working hours
 - Income effect: leisure (as a normal goods) should increase as income increases \rightarrow decrease working hours
- $W1 \rightarrow W2$: Substitution effect > Income effect
- $W2 \rightarrow W3$: Income effect > Substitution effect



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4. **Efficiency v.s. Equality**



4.1 Concept of Efficiency

Pareto efficiency (or sometimes just ***efficiency***) occurs when no possible reorganization of production or distribution can make anyone better off without making someone else worse off.



Vilfredo Pareto (15 July 1848 – 19 August 1923): an Italian engineer, sociologist, economist, political scientist and philosopher.



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 - 4.1 Concept of Efficiency
 - 4.2 Efficiency of **Competitive Market**



An Illustrative Example



- Consider a society consisting of two types of people: buyers and sellers of apple
- There are five sellers:
 - Each produce ONE unit of apple
 - Production costs are different: \$9, \$7, \$5, \$3, \$1
- There are five buyers:
 - Each consume at most ONE unit of apple
 - Willingness to pay are different: \$10, \$8, \$6, \$4, \$2

Price and Trade

- Market is a location where trade takes place
- Why to trade?
 - Evaluation for the same commodity are different across individuals
 - Proper transfer in ownership can raise social surplus
- The role played by the PRICE
 - Make trading possible
 - Split the Consumer Surplus (CS) and the Producer Surplus (PS)
 - Does NOT affect the social surplus gains from the trading



Market

- Why do we need a MARKET?
 - Reduce transaction/trading cost (search, transportation, etc)
 - Improve the matching between buyers and sellers, therefore improve efficiency
- The role played by the PRICE
 - “Invisible hand”



The Two Important Decisions

- Production
 - What to produce?
 - How many?
 - How to produce?
- Consumption
 - How to distribute products among members in the society?
 - What are the principles of allocation?



Buyers with different Willingness-to-pay

A: \$10



B: \$8



C: \$6



D: \$4



E: \$2



Sellers with different Production Costs

5: \$1



4: \$3



3: \$5



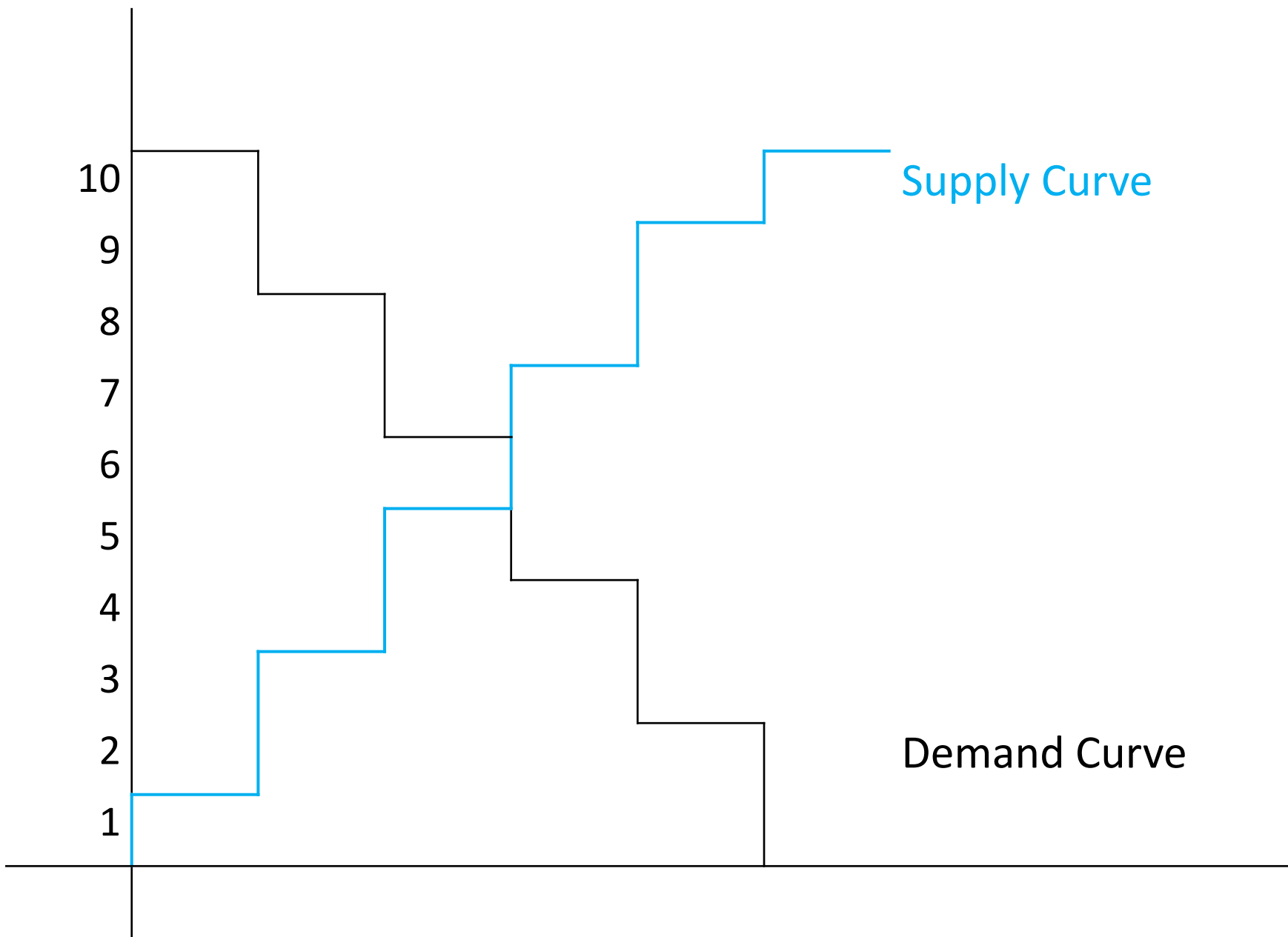
2: \$7



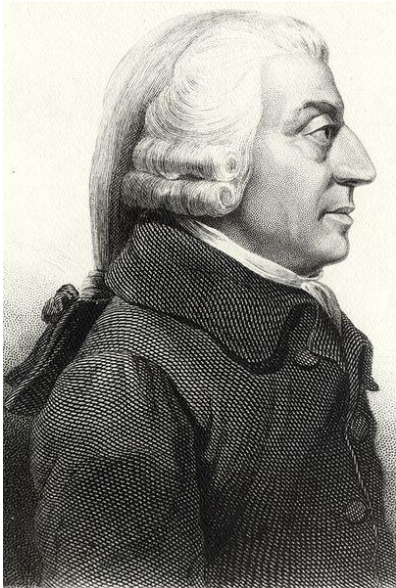
1: \$9



- How to match them in order to generate
 - The highest value of social surplus
 - The highest number of people being able to eat an apple
- Can the free market ensure the above outcomes?



“In competition, individual ambition serves the common good”

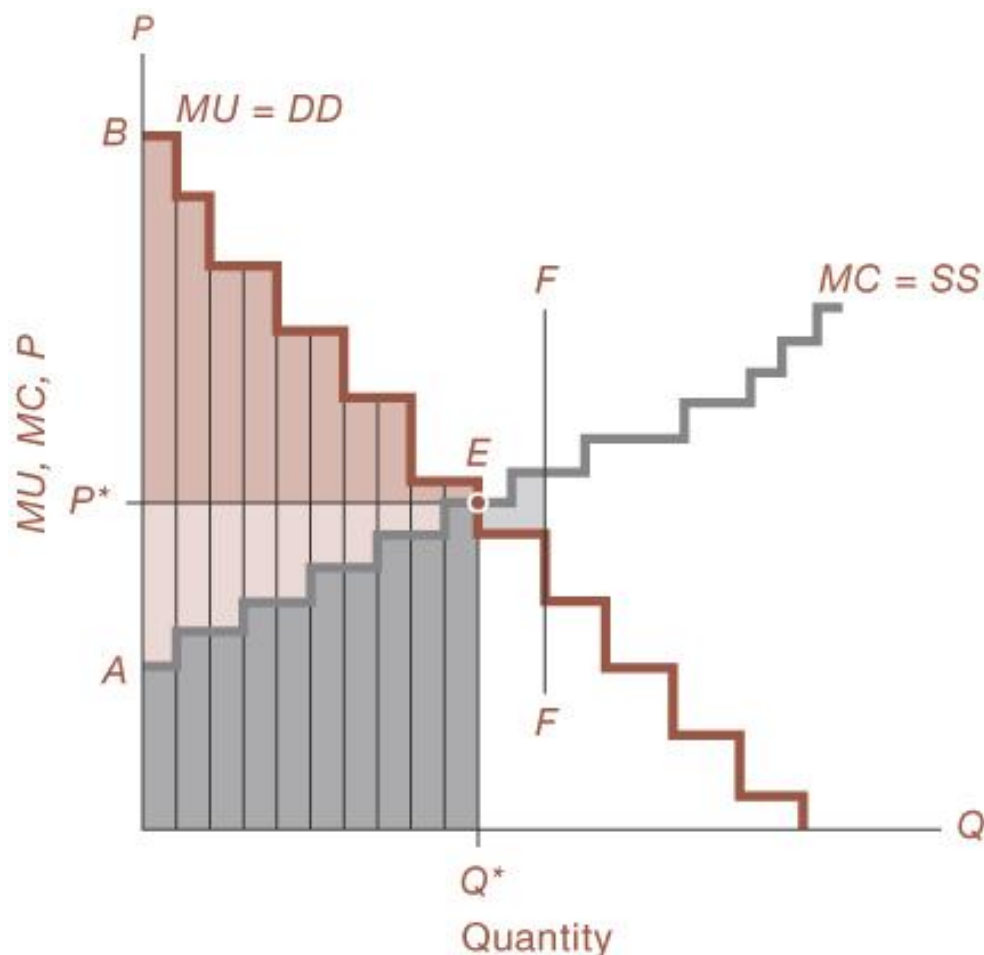


Every individual endeavors to employ his capital so that its produce may be of greatest value. He generally neither intends to promote the public interest, nor knows how much he is promoting it. He intends only his own security, only his own gain. And he is in this led by an invisible hand to promote an end which of no part of his intention. By pursuing his own interest he frequently promotes that of society more effectively than when he really intends to promote it.

“每个人都在力图应用他的资本，来使其生产品能得到最大的价值。一般来说，他并不企图增进公共福利，也不知道他所增进的公共福利是多少。他所追求的仅仅是他个人的安乐，仅仅是他个人的利益。在这样做时，有一支**看不见的手**引导他去促进一种目标，而这种目标决不是他所追求的东西。由于追逐他自己的利益，他经常促进了社会利益，其效果要比他真正想促进社会利益时所得到的效果更大。”

4.2 Efficiency of Competitive Market

- **Consumer surplus:** BPE
- **Producer surplus:** PAE (profits+rents)
- **Economic surplus:** welfare or net utility gain from production and consumption of a good (BAE = BPE+PAE)
- Competitive equilibrium (point E) maximize the economic surplus
 - $P=MU$ consumer surplus is maximized
 - $P=MC$ producer surplus is maximized
 - $MU=MC$ economic surplus is maximized



4.3 Efficiency v.s. Equality



- Problems of a purely equality-driven society
 - Hard-working people cannot obtain the full returns → no incentive to exert effort
 - Everyone remains equal, but equally poor



ALLVOICES

- Problems of a purely efficiency-driven society
 - In reality, everyone is not born equally: family background, ability, etc
 - Some are very poor though no fault of their own, while others are very rich through no virtue of their own
 - Concerns on humanity
 - May jeopardize the social stability, which in turns endanger the efficiency

Role of the government: Find an optimal balance between the two for a sustainable growth with a harmony society

4.4 Market Failures

- Imperfect Competition
 - Monopoly and Oligopoly
- Externalities
 - Negative: Pollution
 - Positive: Vaccines
- Imperfect Information
 - Lemon Market

