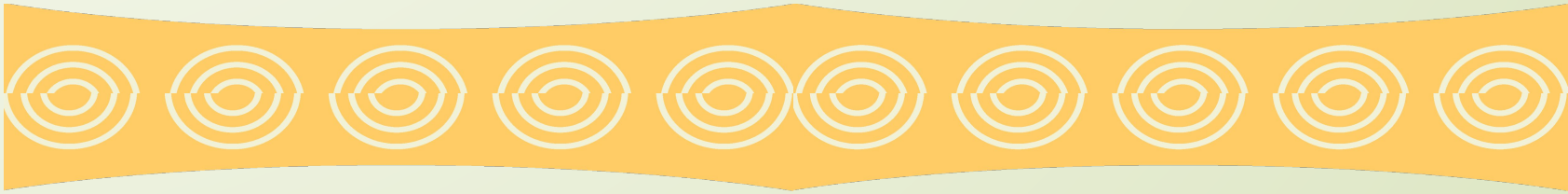
An Introduction to Perfect Competition

- Market structure
  - Number of suppliers
  - Product's degree of uniformity
  - Ease of entry into the market
  - Forms of competition among forms
- Industry
  - All firms supplying output to a market

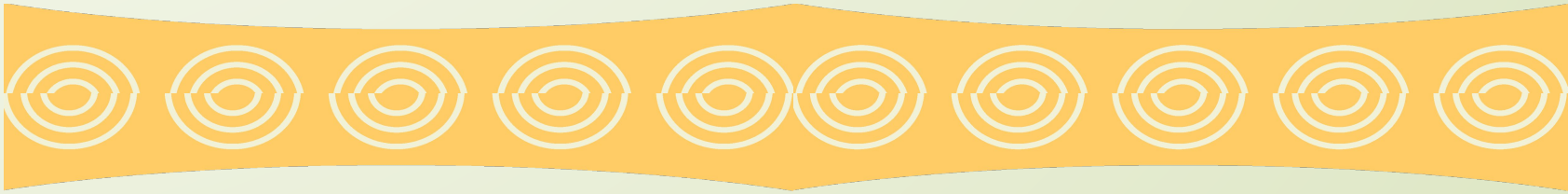


Perfectly Competitive Market Structure

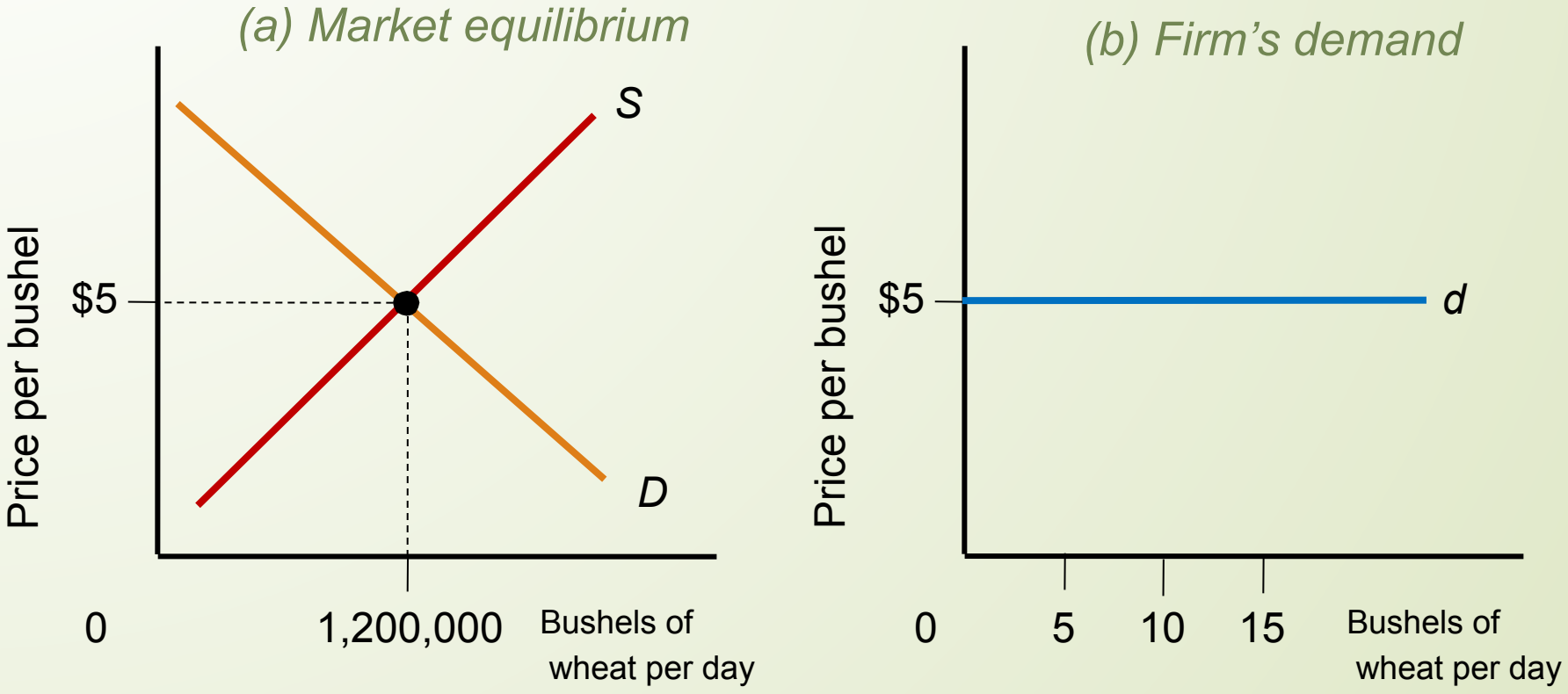
- **Many buyers and sellers**
- **Identical/standardized product**
- **No information asymmetry,** i.e. buyers and sellers are fully informed
- **No barriers to entry and exit**
- **Individual buyer or seller**
  - **No control over price**
  - **Price takers**

Demand Under Perfect Competition

- Market price
  - Determined by S and D
- Demand curve facing one supplier
  - Horizontal line at the market price
  - Perfectly elastic
- Price taker



Market Equilibrium and a Firm's Demand Curve in Perfect Competition



Market price ($5)- determined by the intersection of the market demand and market supply curves. A perfectly competitive firm can sell any amount at that price. The demand curve facing the perfectly competitive firm - horizontal at the market price.

Short-Run Profit Maximization

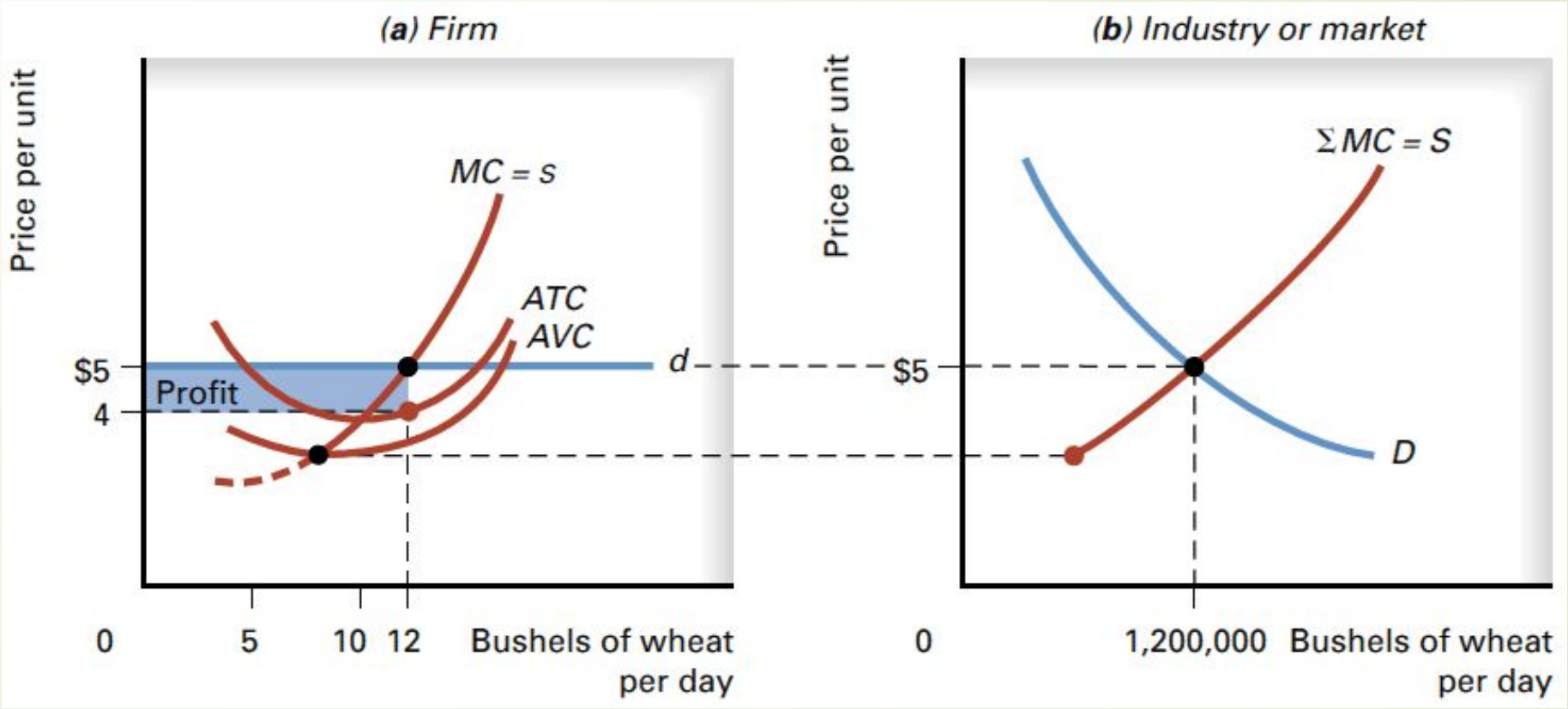
- Maximize economic profit
  - Quantity at which TR exceeds TC by the greatest amount
- Total revenue TR
- Total cost TC
- Profit = TR – TC
- If TR > TC: economic profit
- If TC > TR: economic loss

Short-Run Profit Maximization

- Marginal Cost, MC = $\frac{\Delta TC}{\Delta Q}$
- Marginal revenue, MR = $\frac{\Delta TR}{\Delta Q}$ = P = AR
- Under perfect competition: P=MR=AR

Profit maximization condition: MR=MC

Short-Run Profit



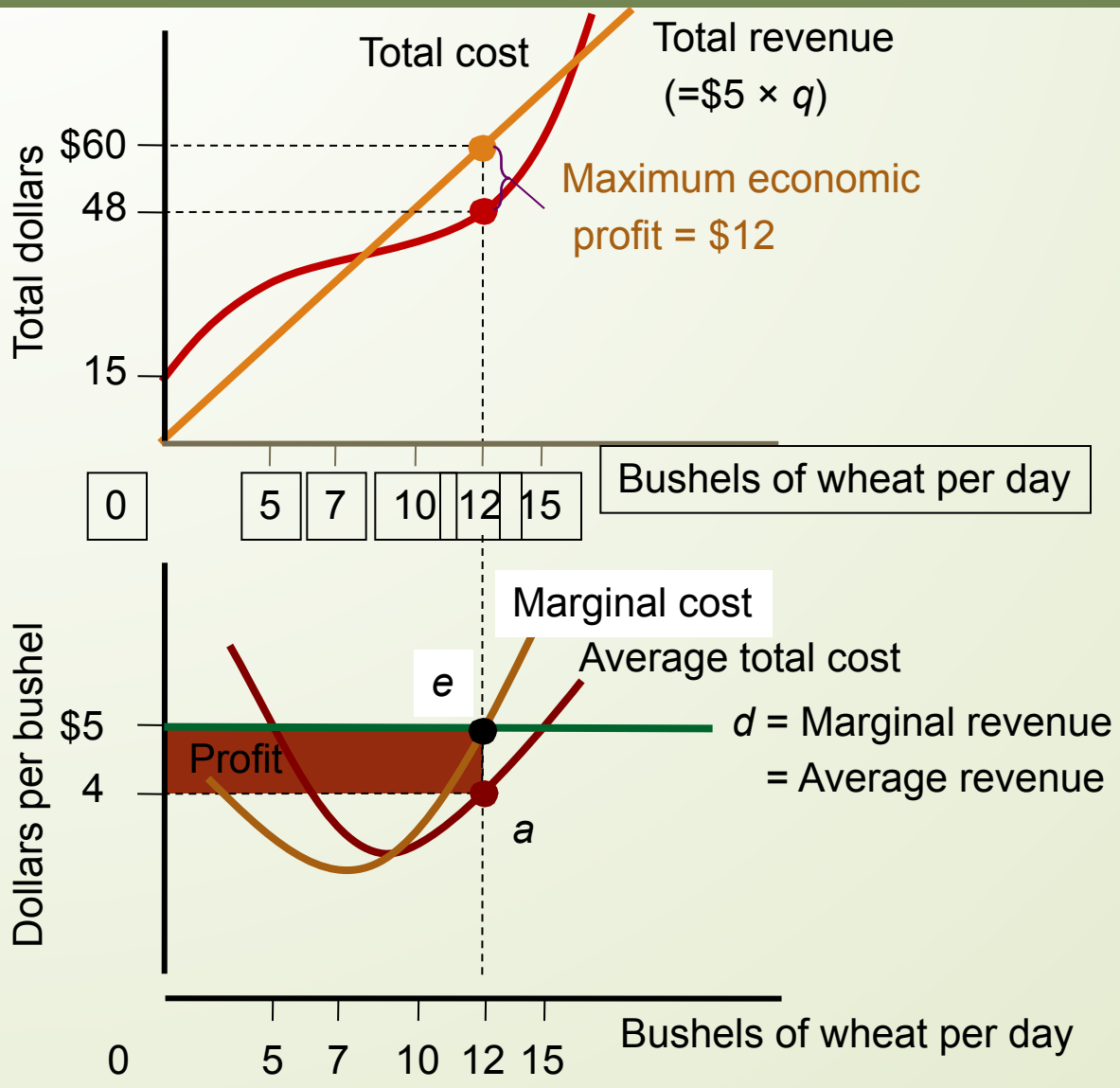
Market price $5 determines the perfectly elastic demand curve (and MR) facing the individual firm.

S = horizontal sum of the supply curves of all firms in the industry Intersection of S and D: market price $5

Short-Run Cost and Revenue for a Perfectly Competitive Firm

(1) Bushels of Wheat per Day (q)	(2) Marginal Revenue (Price) (p)	(3) Total Revenue ($TR = q \times p$)	(4) Total Cost (TC)	(5) Marginal Cost ($MC = \Delta TC/\Delta q$)	(6) Average Total Cost ($ATC = TC/q$)	(7) Economic Profit or Loss = $TR - TC$
0	—	$ 0	$15.00	—	—	−$15.00
1	$5	5	19.75	$4.75	$19.75	−14.75
2	5	10	23.50	3.75	11.75	−13.50
3	5	15	26.50	3.00	8.83	−11.50
4	5	20	29.00	2.50	7.25	−9.00
5	5	25	31.00	2.00	6.20	−6.00
6	5	30	32.50	1.50	5.42	−2.50
7	5	35	33.75	1.25	4.82	1.25
8	5	40	35.25	1.50	4.41	4.75
9	5	45	37.25	2.00	4.14	7.75
10	5	50	40.00	2.75	4.00	10.00
11	5	55	43.25	3.25	3.93	11.75
12	**5**	**60**	**48.00**	**4.75**	**4.00**	**12.00**
13	5	65	54.50	6.50	4.19	10.50
14	5	70	64.00	9.50	4.57	6.00
15	5	75	77.50	13.50	5.17	−2.50
16	5	80	96.00	18.50	6.00	−16.00

Short-Run Profit Maximization



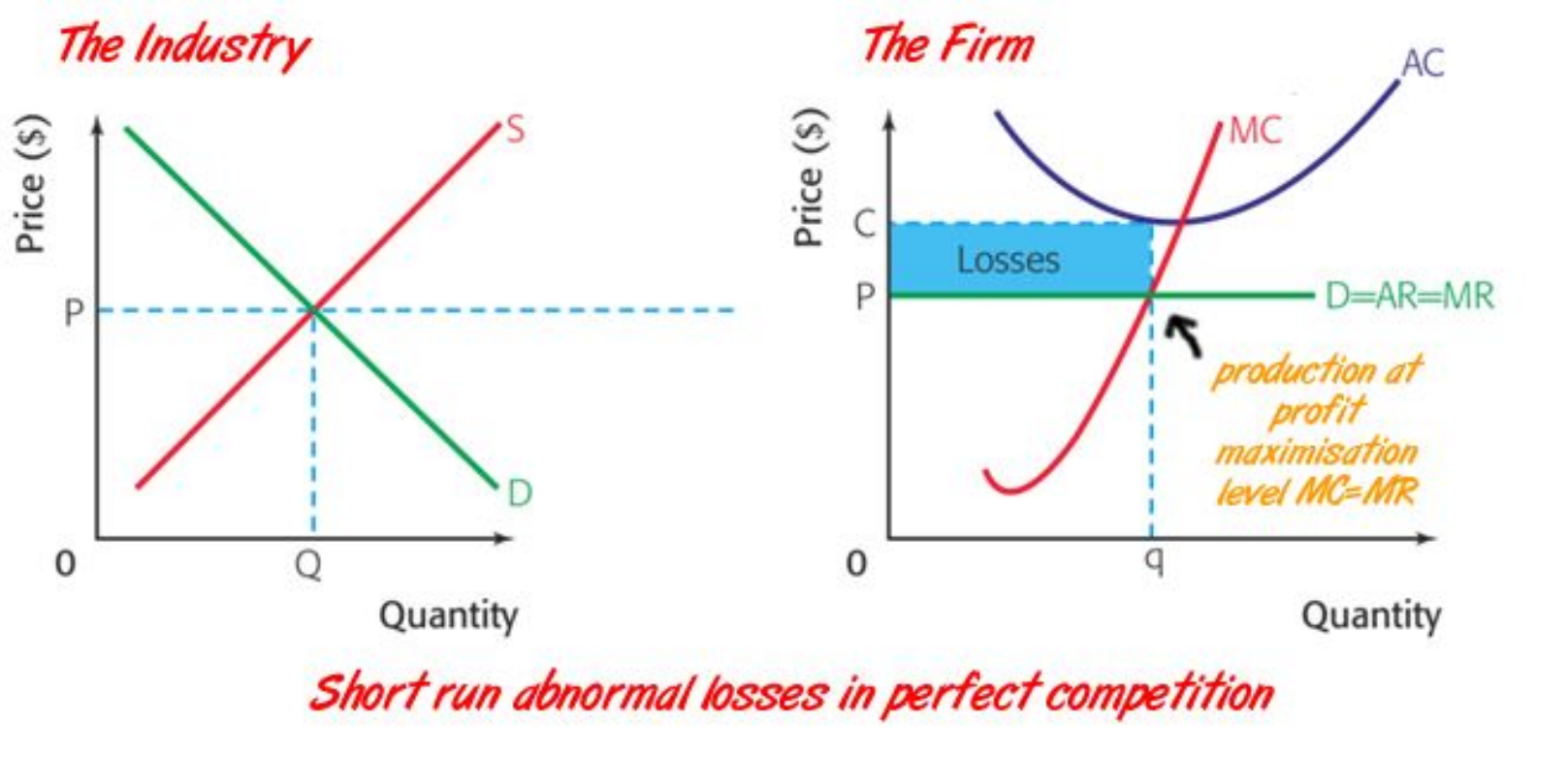
(a) Total revenue minus total cost

TR: straight line, slope=5=P
TC increases with output
Max Economic profit:
where TR exceeds TC by the greatest amount

(b) Marginal cost equals marginal revenue

MR: horizontal line at P=$5
Max Economic profit:
at 12 bushels,
where MR=MC

Short-Run Loss



Minimizing Short-Run Losses

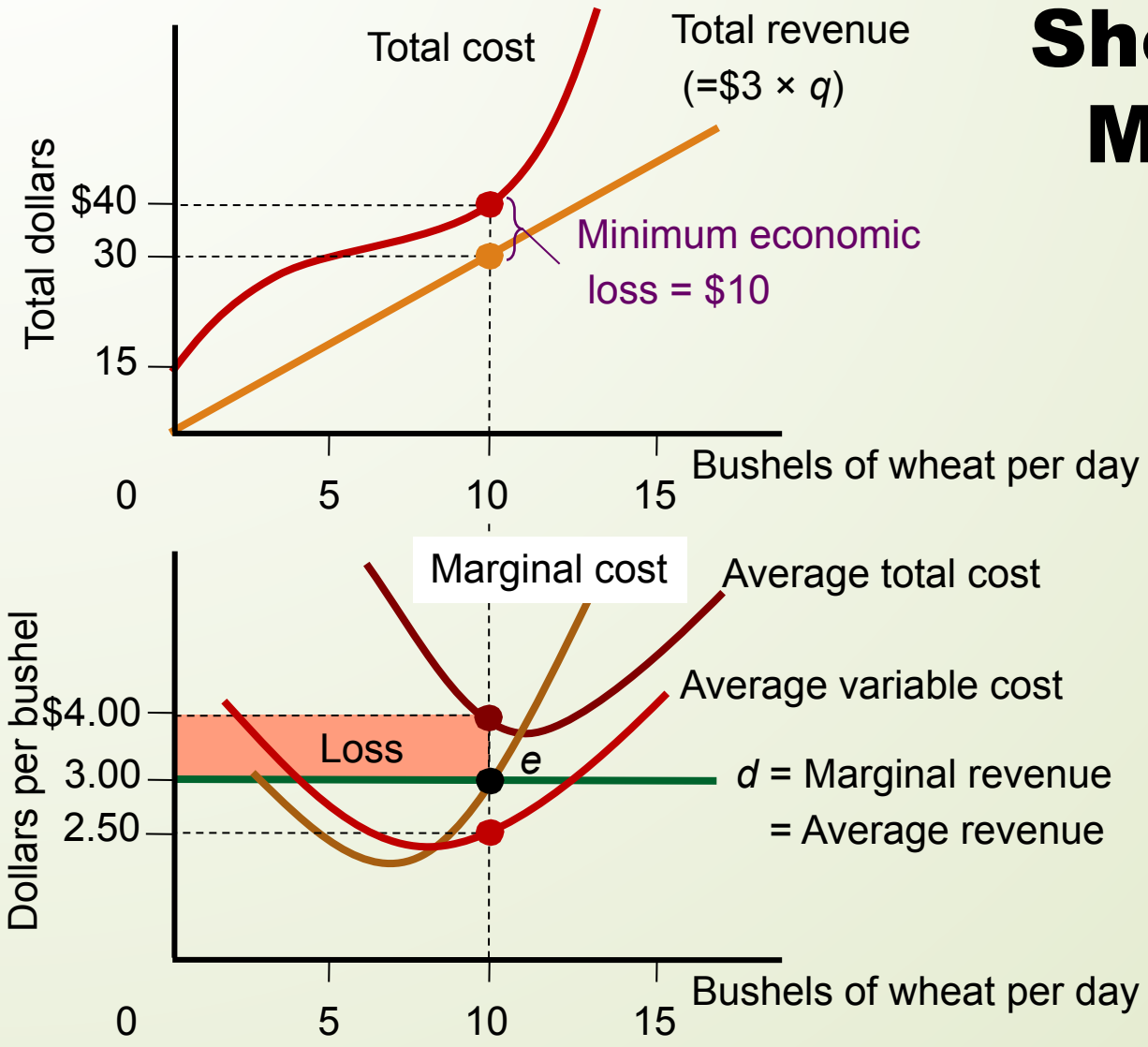
- TC = FC+VC
- Shut down in short run: pay fixed cost
- If TC<TR: economic loss
  - Produce if TR>VC (P>AVC)
    - Revenue covers variable costs and a portion of fixed cost
    - Loss < fixed cost
  - Shut down if TR<VC (P<AVC)
    - Loss = FC

Minimizing Short-Run Losses

(1) Bushels of Wheat per Day (q)	(2) Marginal Revenue (Price) (p)	(3) Total Revenue ($TR = q \times p$)	(4) Total Cost (TC)	(5) Marginal Cost ($MC = \Delta TC/\Delta q$)	(6) Average Total Cost ($ATC = TC/q$)	(7) Average Variable Cost ($AVC = VC/q$)	(8) Economic Profit or Loss = $TR - TC$
0	—	$ 0	$15.00	—	—	—	−$15.00
1	$3	3	19.75	$4.75	$19.75	$4.75	−16.75
2	3	6	23.50	3.75	11.75	4.25	−17.50
3	3	9	26.50	3.00	8.83	3.83	−17.50
4	3	12	29.00	2.50	7.25	3.50	−17.00
5	3	15	31.00	2.00	6.20	3.20	−16.00
6	3	18	32.50	1.50	5.42	2.92	−14.50
7	3	21	33.75	1.25	4.82	2.68	−12.75
8	3	24	35.25	1.50	4.41	2.53	−11.25
9	3	27	37.25	2.00	4.14	2.47	−10.25
10	**3**	**30**	**40.00**	**2.75**	**4.00**	**2.50**	**−10.00**
11	3	33	43.25	3.25	3.93	2.57	−10.25
12	3	36	48.00	4.75	4.00	2.75	−12.00
13	3	39	54.50	6.50	4.19	3.04	−15.50
14	3	42	64.00	9.50	4.57	3.50	−22.00
15	3	45	77.50	13.50	5.17	4.17	−32.50
16	3	48	96.00	18.50	6.00	5.06	−48.00

LO^3

Exhibit 5



Short-Run Loss Minimization

(a) Total revenue minus total cost

- TC>TR; loss
- Minimize loss: 10 bushels

(b) Marginal cost equals marginal revenue

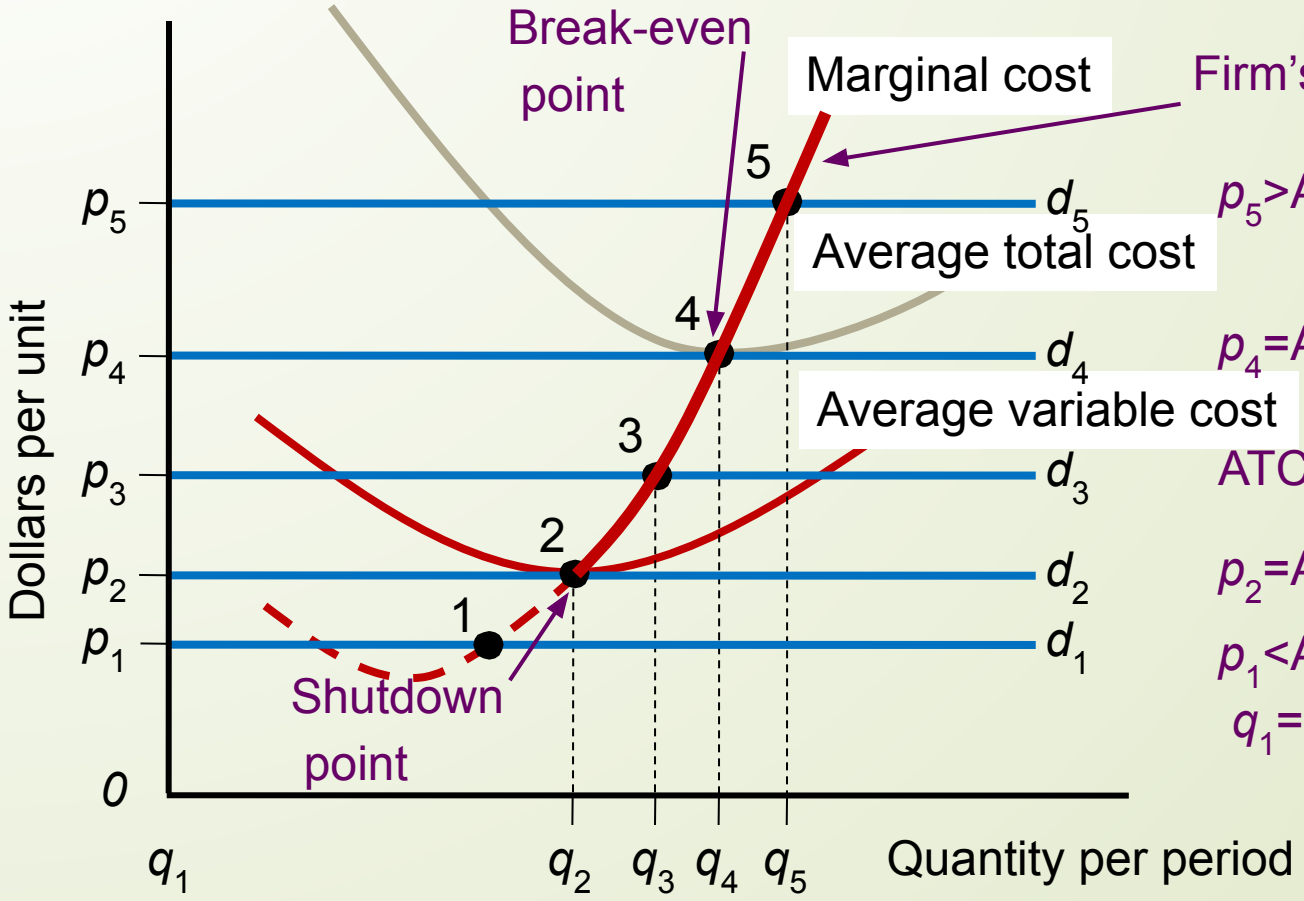
- MR=MC=$3; ATC=$4
- P=$3; P>AVC
- Continue to produce in short run

Firm and Industry Short-Run S Curves

- Short-run firm supply curve
  - Upward sloping portion of MC curve
  - Above minimum AVC curve
- Short-run industry supply curve
  - Horizontal sum of all firms' short-run supply curves

Exhibit 6

Summary of Short-Run Output Decisions



p_5>ATC, q_5, economic profit

p_4=ATC, q_4, normal profit

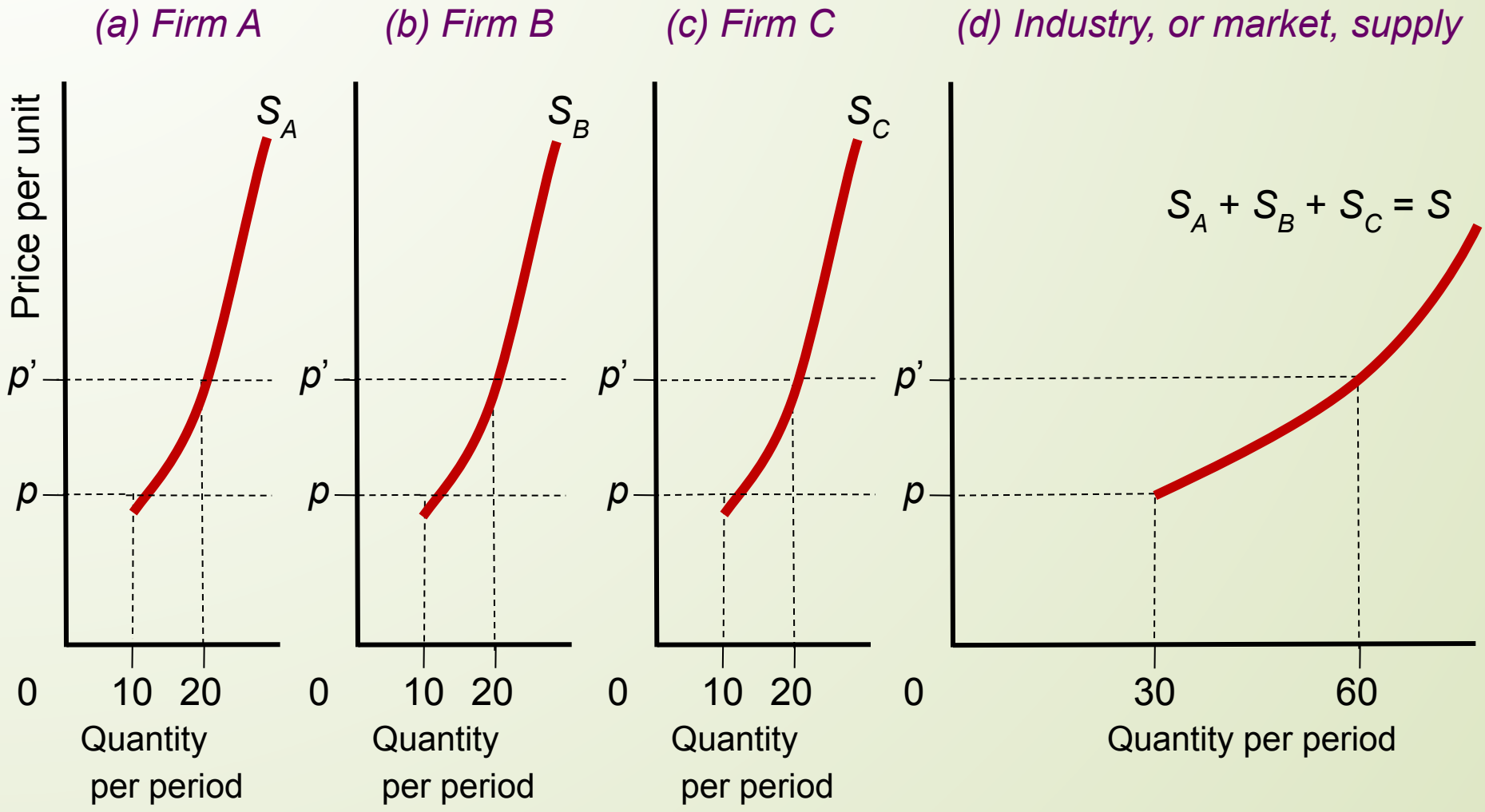
ATC>p_3>AVC, q_3, loss <FC

p_2=AVC, q_2 or 0, loss=FC

p_1<AVC, shut down, q_1=0,loss=FC

Exhibit 7

Aggregating Individual Supply to Form Market Supply



Firm Supply and Market Equilibrium

- Short run, perfect competition
  - Market converges to equilibrium P and Q
  - Firm
    - Max profit
    - Min loss
    - Shuts down temporarily

LO4 Auction Markets

- Dutch auction
  - Starts at a high price and works down
  - Selling multiple lots of similar items
- English open outcry auction
  - Starts at low price and works up
- Internet auctions
- Nasdaq – virtual stock market

Perfect Competition in the Long Run

- Long run
  - Firms enter/exit the market
  - Firms adjust scale of operations
    - Until average cost is minimized
  - All resources are variable

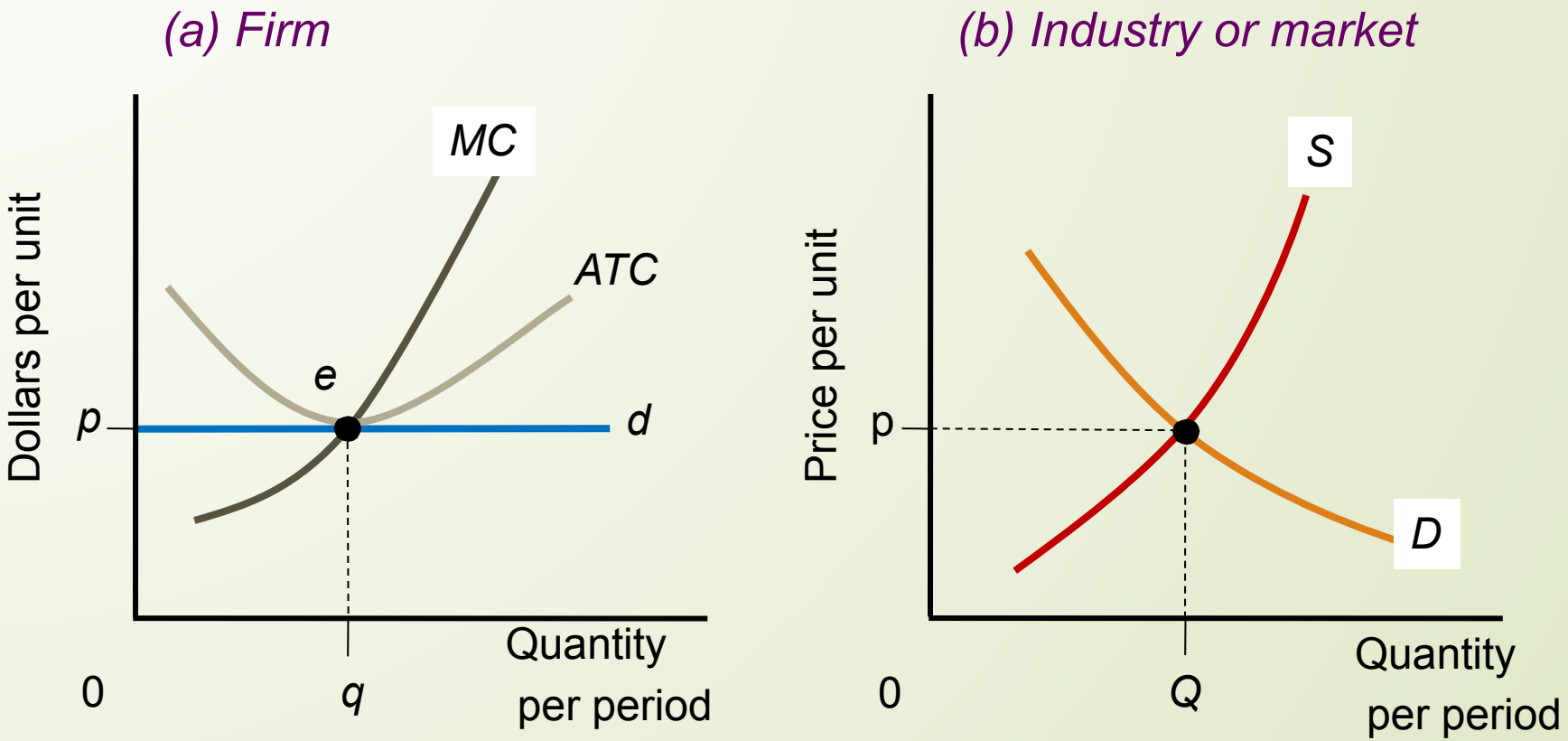
Perfect Competition in the Long Run

- Economic loss in short run
  - Some firms exit the market in long run
  - Some firms reduce scale in long run
  - Market S decreases
    - P increases
    - Economic loss disappears
    - Firms break even

Zero Economic Profit in the Long Run

- Firms enter, leave, change scale
- Market:
  - S shifts; P changes
- Firm
  - d(P=MR=AR) shifts
  - Long run equilibrium
    - MR=MC =ATC=LRAC
    - Normal profit
    - Zero economic profit

Long-Run Equilibrium for a Firm and the Industry

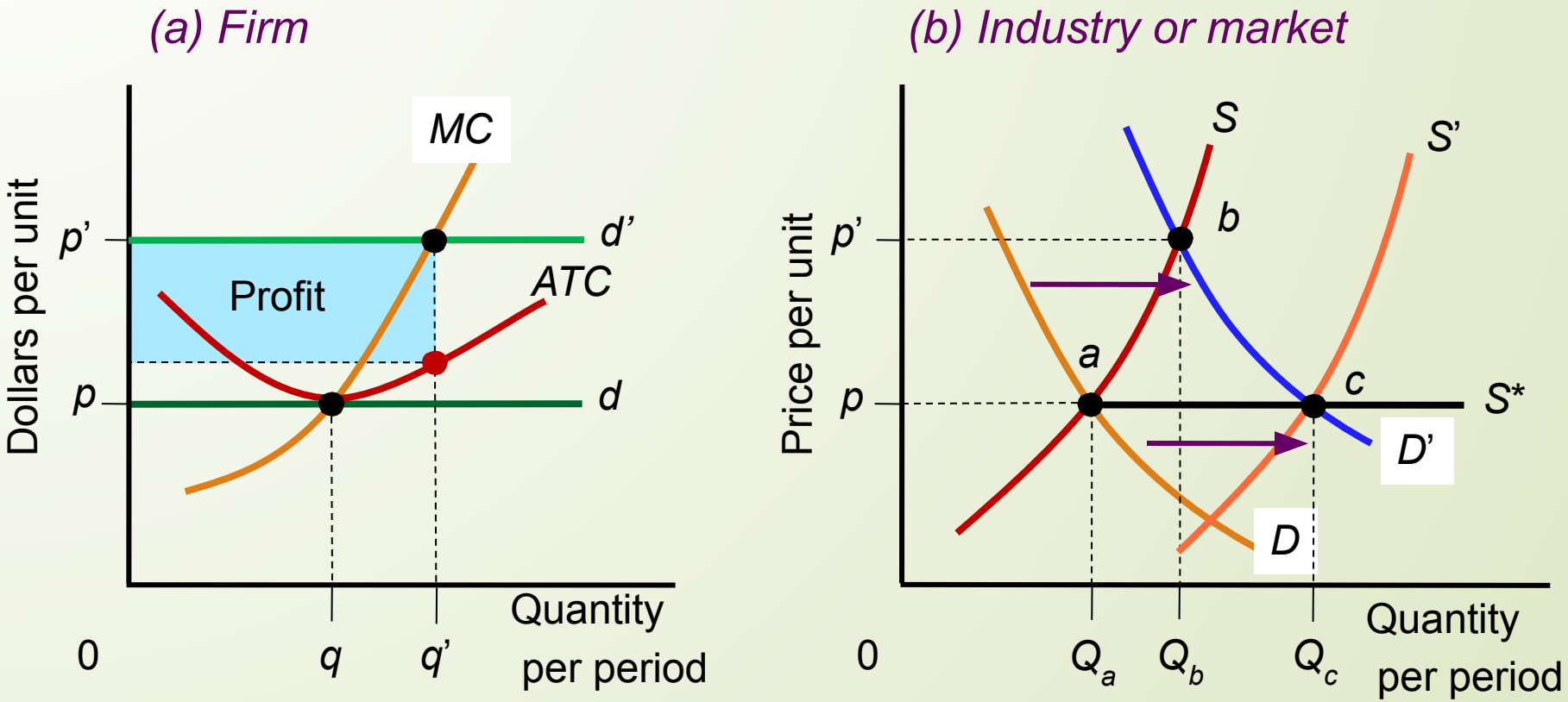


Long run equilibrium: *P=MC=MR=ATC*. No reason for new firms to enter the market or for existing firms to leave. As long as the market demand and supply curves remain unchanged, the industry will continue to produce a total of *Q* units of output at price *p*.

Long-Run Adjustment to a Change in D

- Effects of an Increase in Demand
  - Short run
    - P increases; *d* increases
    - Firms increase quantity supplied
    - Economic profit
  - Long run
    - New firms enter the market
    - S increases, P decreases
    - Firm's *d* curve decreases
    - Normal profit

Long-Run Adjustment to an Increase in Demand



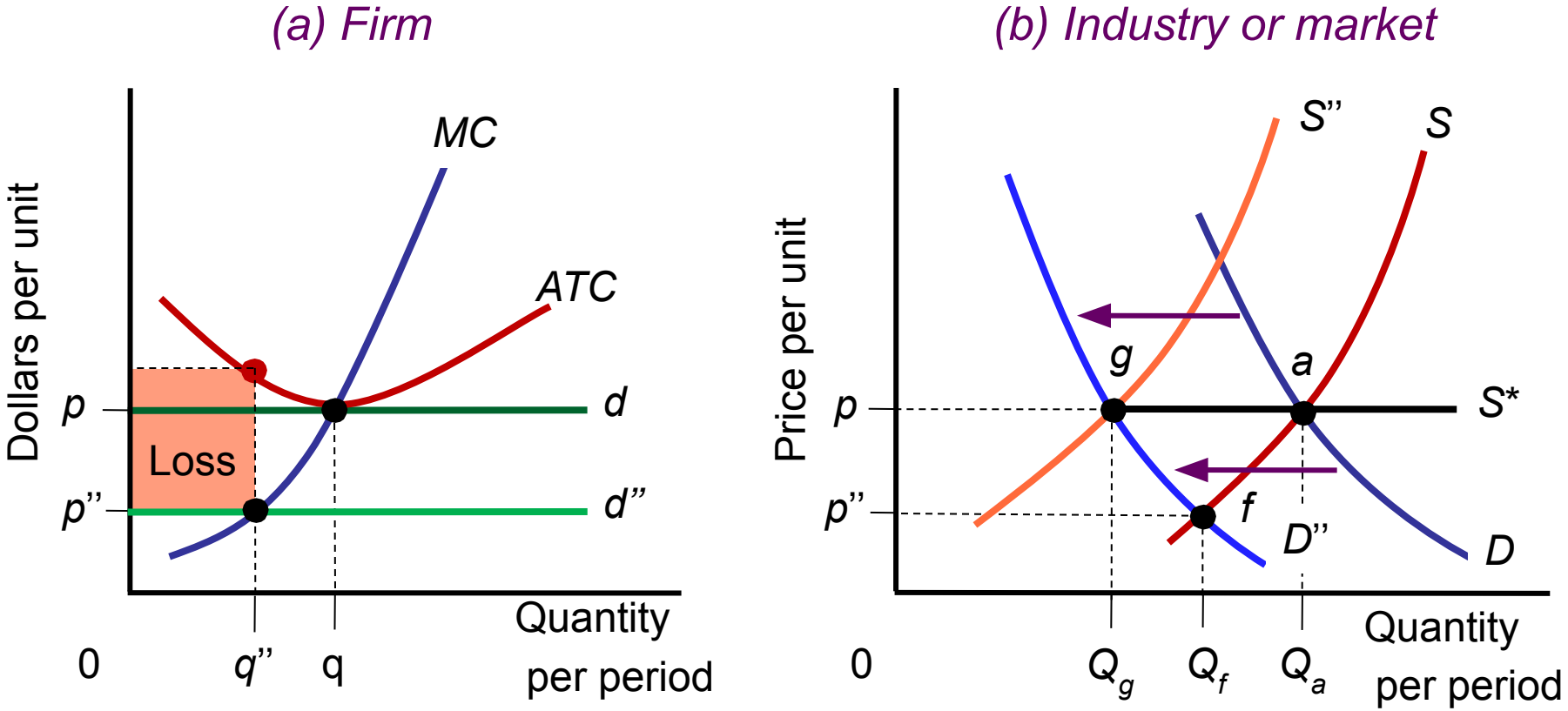
Increase in *D* to *D*' moves the market equilibrium point from *a* to *b*; firm's demand increases to *d'*; economic profit in short run.

Long run: new firms enter the industry; supply increases to *S*'; price drops back to *p*; firm's demand drops back to *d*.

Long-Run Adjustment to a Change in D

- Effects of a Decrease in Demand
  - Short run
    - P decreases; *d* decreases
    - Firms decrease quantity supplied
    - Economic loss
  - Long run
    - Firms exit the market
    - S decreases, P increases
    - Firm's *d* curve increases
    - Normal profit

Long-Run Adjustment to a Decrease in Demand



Decrease in *D* to *D"* moves the market equilibrium point from *a* to *f*; firm's demand decreases to *d"*; economic loss in short run.

Long run: firms exit the industry; supply decreases to *S"*; price increases back to *p*; firm's demand rises back to *d*.

The Long-Run Industry Supply Curve

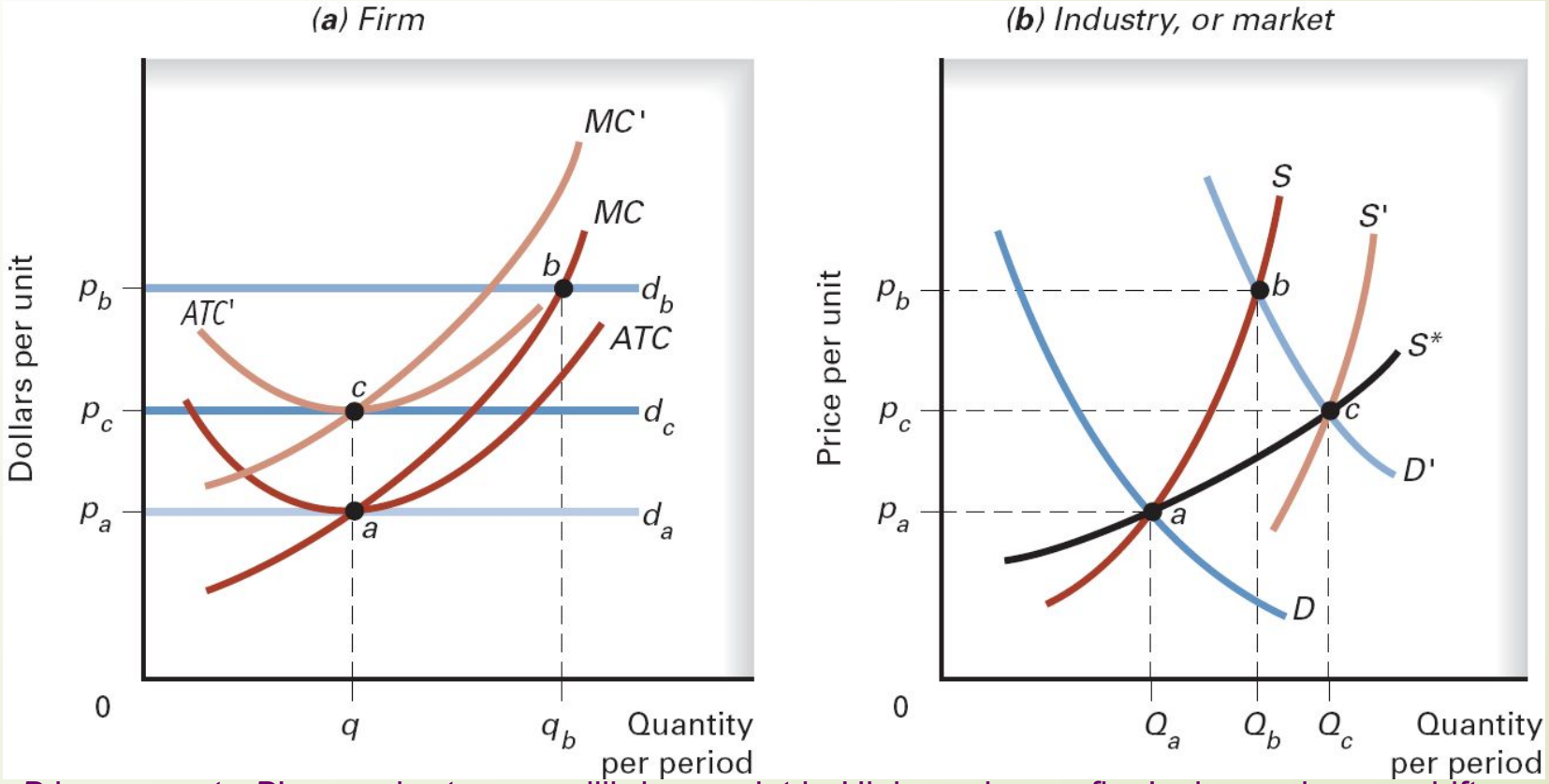
- Short run
  - Change quantity supplied along MC curve
- Long run industry supply curve S*
  - After firms fully adjust
- Constant-cost industries
  - LRAC doesn't shift with output
  - Long run S* curve for industry: straight horizontal line

Increasing Cost Industries

- Average costs increase as output expands
- Effects of an increase in demand
  - Short run
    - P increases; *d* increases
    - Firms increase q; Economic profit
  - Long run
    - New firms enter the market;
    - Market: S increases; P decreases
    - Firm: MC and ATC increase; *d* curve decreases; Zero economic profit

Exhibit 12

An Increasing-Cost Industry



D increases to *D*', new short-run equilibrium: point b. Higher price p_b; firm's demand curve shifts up (d_b); economic profit, which attracts new firms.

Input prices go up, *MC* and *ATC* curves shift up.

Market *S* increases to *S*'; new price p_c, firm's demand curve shifts down to d_c; normal profit.

Perfect Competition and Efficiency

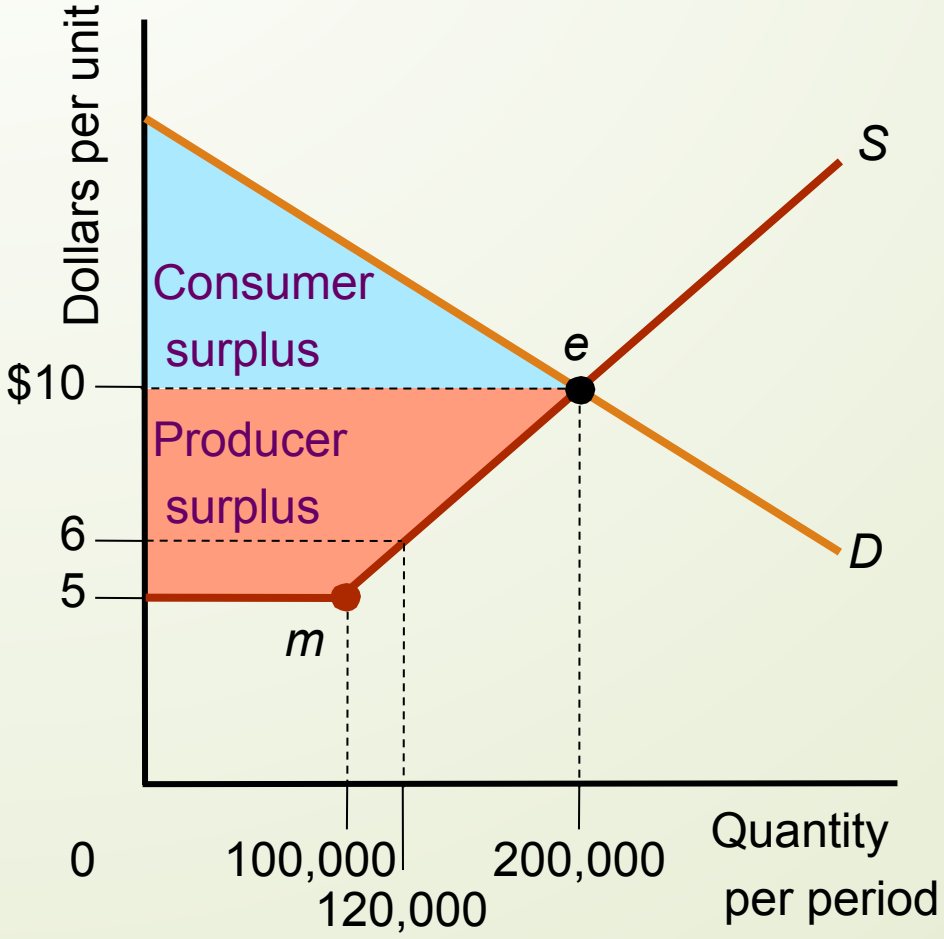
- Productive efficiency: Making Stuff Right
  - Produce output at the least possible cost
    - Min point on LRAC curve
    - P = min average cost in long run
- Allocative efficiency: Making the Right Stuff
  - Produce output that consumers value most
    - Marginal benefit = P = Marginal cost
    - Allocative efficient market

What's So Perfect About Perfect Competition?

- Consumer surplus
  - Consumers pay less (P) than they are willing to pay (along D curve)
- Producer surplus
  - Producers are willing to accept less (along S curve; MC) than what they are receiving (P)
- Gains from voluntary exchange
  - Consumer and producer surplus
  - Productive and allocative efficiency
  - Maximum social welfare

Exhibit 13

Consumer Surplus and Producer Surplus for a Competitive Market



Consumer surplus: area above the market-clearing price ($10) and below the demand.

Producer surplus: area above the short-run market supply curve and below the market-clearing price

At p=$5: no producer surplus; the price just covers each firms AVC.

At p=$6: producer surplus is the area between $5, $6, and S curve.

Experimental Economics

- Double-continuous auction
  - Tests subjects (buyers, sellers)
    - Market equilibrium
    - Max social welfare
    - Adjust fast to changing market conditions
    - High transaction costs
- Posted-offer pricing
  - Price is marked not negotiated
    - Slow adjustment to changing market conditions
    - Low transaction costs