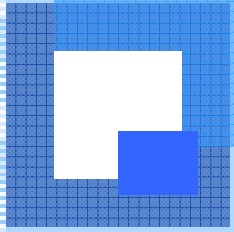


Chapter 9

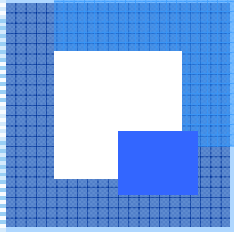
Pricing and Output Decisions: Perfect Competition and Monopoly

*Managerial Economics: Economic
Tools for Today's Decision Makers, 4/e
By Paul Keat and Philip Young*



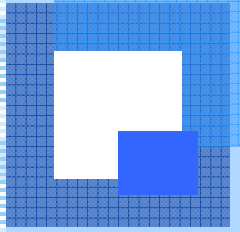
Pricing and Output Decisions: Perfect Competition and Monopoly

- Four Basic Market Types
- Pricing and Output Decisions in Perfect Competition
 - Basic Business Decision
 - Key Assumptions
 - Total Revenue - Total Cost Approach
 - Marginal Revenue - Marginal Cost Approach
 - Economic Profit, Normal Profit, Loss, and Shutdown
 - The Long Run
- Pricing and Output Decisions in Monopoly



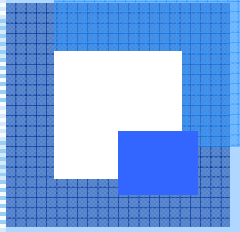
Four Basic Market Types

- Perfect Competition
- Monopoly
- Monopolistic Competition
- Oligopoly



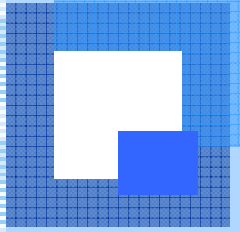
Four Basic Market Types

- Perfect Competition (*no market power*)
 - Large number of relatively small buyers and sellers
 - Standardized product
 - Very easy market entry and exit
 - Non-price competition not possible



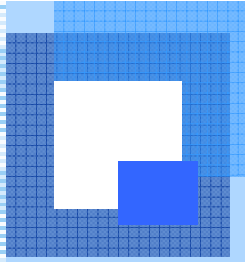
Four Basic Market Types

- Monopoly (*absolute market power subject to government regulation*)
 - One firm, firm is the industry
 - Unique product or no close substitutes
 - Market entry and exit difficult or legally impossible
 - Non-price competition not necessary



Four Basic Market Types

- Monopolistic Competition (*market power based on product differentiation*)
 - Large number of relatively small firms acting independently
 - Differentiated product
 - Market entry and exit relatively easy
 - Non-price competition very important

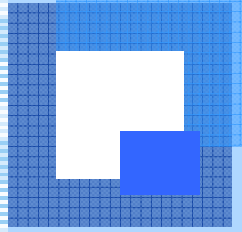


Four Basic Market Types

- Oligopoly (*market power based on product differentiation and/or the firm's dominance of the market*)
 - Small number of relatively large firms that are mutually interdependent
 - Differentiated or standardized product
 - Market entry and exit difficult
 - Non-price competition very important among firms selling differentiated products

Four Basic Market Types

	MARKET TYPE			
MARKET CHARACTERISTICS	PERFECT COMPETITION	MONOPOLISTIC COMPETITION	OLIGOPOLY	MONOPOLY
Number and size of firms	Very large number of relatively small firms	Large number of relatively small firms	Small number of relatively large firms	One
Type of product	Standardized	Differentiated	Standardized or differentiated	Unique
Market entry and exit	Very easy	Easy	Difficult	Very difficult or impossible
Non-price competition	Impossible	Possible	Possible or difficult	Not necessary
KEY INDICATORS OF COMPETITION				
Market power	None	Low to high	Low to high	High
Long-run economic profit	None	None	Low to high, subject to mutual interdependence	High, subject to regulation

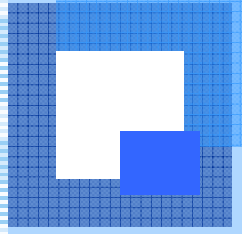


Pricing and Output Decisions in Perfect Competition

- The Basic Business Decision

The decision to continue competing in a market depends upon the answers to the following questions:

- How much should we produce?
- If we produce such an amount, how much profit will we earn?
- If a loss rather than a profit is incurred, will it be worthwhile to continue in this market in the long run or should we exit?



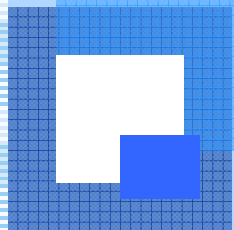
Key Assumptions in Perfect Competition

- Price taker
- Distinction between short run and long run
- Objective is to maximize profit or minimize loss in the short run
- Opportunity cost is included in decision making



Key Assumptions in Perfect Competition

- Review of terminology
 - Economic cost includes explicit costs and opportunity costs
 - Normal profit occurs when revenue just covers all of the firm's economic cost
 - Economic loss occurs when revenue fails to cover the firm's economic cost
 - Economic profit occurs when revenue more than covers the firm's economic cost



Key Assumptions in Perfect Competition

	NORMAL PROFIT	ECONOMIC PROFIT	ECONOMIC LOSS
Revenue	\$500,000	\$550,000	\$480,000
Accounting cost	450,000	450,000	450,000
Opportunity cost	<u>50,000</u>	<u>50,000</u>	<u>50,000</u>
Profit	0	\$50,000	(\$20,000)

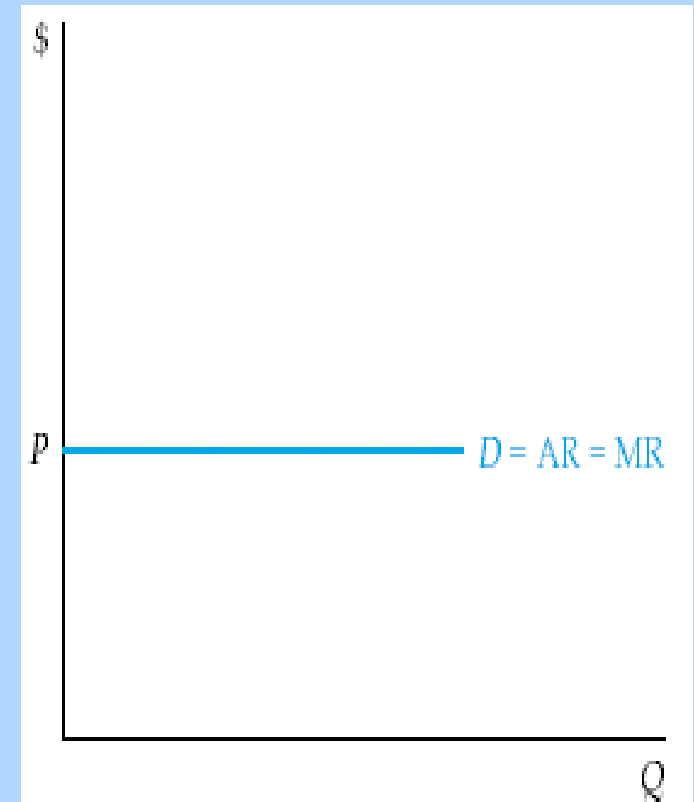
Note: Accounting profit for \$50,000 equals the opportunity cost of \$50,000.

Accounting profit of \$100,000 exceeds the opportunity cost of \$50,000.

Accounting profit of \$30,000 is less than the opportunity cost of \$50,000.

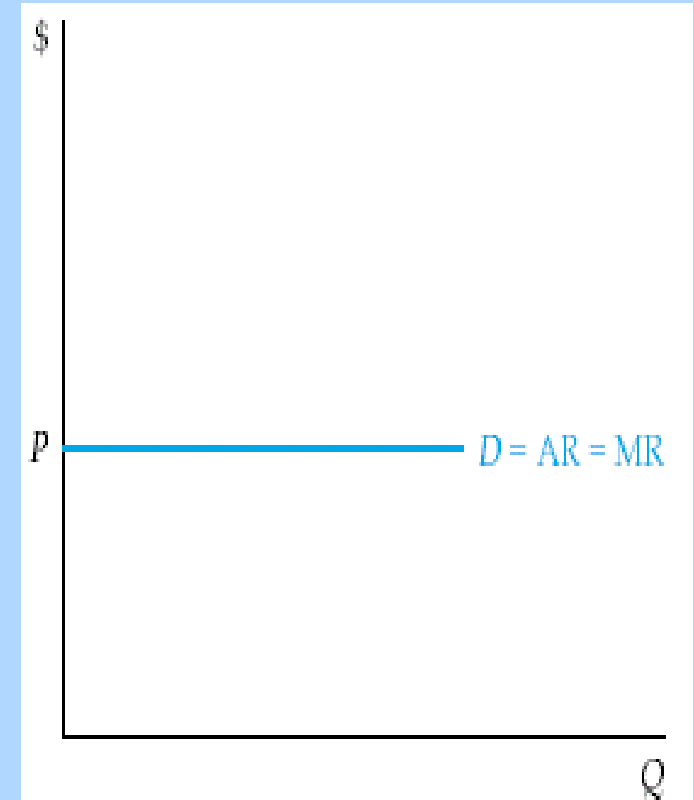
Key Assumptions in Perfect Competition

- The Demand Curve Facing the Firm
 - Since the firm is a price taker, the price to the firm for each unit remains the same no matter how much the firm sells.
 - Perfectly Elastic since consumers are willing to buy as much as the firm is willing to sell *at the going market price*.
 - Horizontal at the market price



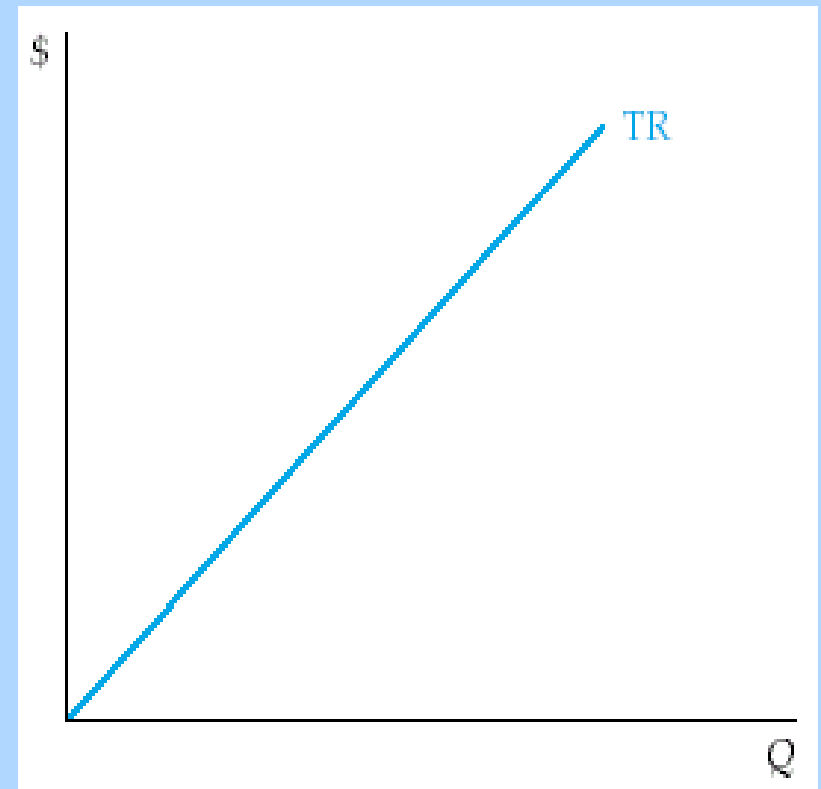
Key Assumptions in Perfect Competition

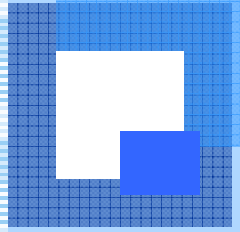
- Marginal Revenue and Average Revenue
 - Since the firm receives the market price for each unit sold, and this market price does not change, the firm's marginal revenue (MR) and average revenue (AR) curves are also horizontal at the market price.



Key Assumptions in Perfect Competition

- Marginal Revenue
 - Marginal revenue tells us how total revenue changes as we sell an additional unit.
 - Marginal revenue represents the slope of the total revenue curve.
 - Since MR is positive and constant, the total revenue (TR) curve is increasing at a constant rate.





Selecting the Optimal Output Level

Total Revenue – Total Cost Approach

- Compare the total revenue and total cost schedules and find the level of output that either maximizes the firm's profits or minimizes its loss.

Selecting the Optimal Output Level

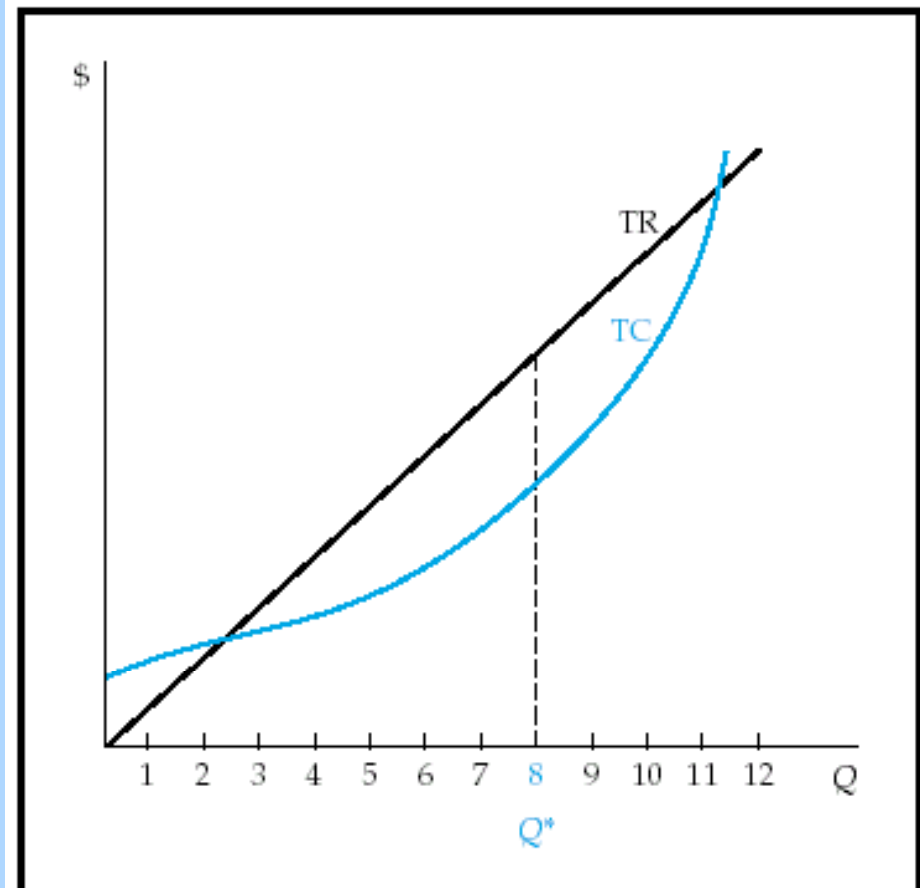
Total Revenue – Total Cost Approach

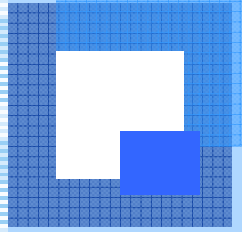
QUANTITY (Q)	PRICE (P)	TOTAL REVENUE (TR)	TOTAL FIXED COST (TFC)	TOTAL VARIABLE COST (TVC)	TOTAL COST (TC)	TOTAL PROFIT (π)
0	110	0	100	0.00	100.00	-100.00
1	110	110	100	55.70	155.70	-45.70
2	110	220	100	105.60	205.60	-14.40
3	110	330	100	153.90	253.90	76.10
4	110	440	100	204.80	304.80	135.20
5	110	550	100	262.50	362.50	187.50
6	110	660	100	331.20	431.20	228.80
7	110	770	100	415.10	515.10	254.90
8	110	880	100	518.40	618.40	261.60
9	110	990	100	645.30	745.30	244.70
10	110	1100	100	800.00	900.00	200.00
11	110	1210	100	986.70	1086.70	123.30
12	110	1320	100	1209.60	1309.60	10.40

Selecting the Optimal Output Level

Total Revenue – Total Cost Approach

- Graphically, find the output level that maximizes the distance between the total revenue curve and the total cost curve.

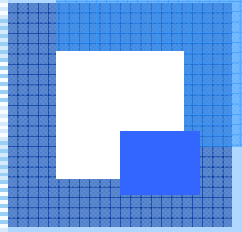




Selecting the Optimal Output Level

Marginal Revenue – Marginal Cost Approach

- Marginal revenue is the revenue the firm receives from selling an additional unit.
- Marginal cost is the cost the firm incurs by producing an additional unit.
- If marginal revenue exceeds marginal cost it is worthwhile for the firm to produce and sell an additional unit.



Selecting the Optimal Output Level

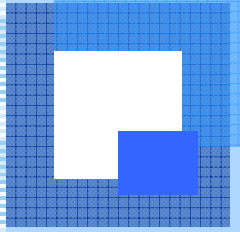
Marginal Revenue – Marginal Cost Approach

- MR=MC Rule
 - A firm that wants to maximize its profit (or minimize its loss) should produce a level of output at which the additional revenue received from the last unit is equal to the additional cost of producing that unit. In short, $MR=MC$.
 - Applies to *any firm* that wishes to maximize profit.
 - For the perfectly competitive firm, the rule may be restated, $P=MC$. Why?

Selecting the Optimal Output Level

Marginal Revenue – Marginal Cost Approach

QUANTITY (Q)	MARGINAL REVENUE (MR = P = AR)	AVERAGE FIXED Cost (AFC)	AVERAGE VARIABLE Cost (AVC)	AVERAGE TOTAL Cost (AC)	MARGINAL Cost (MC)	MARGINAL PROFIT (M π)
0	100					
1	110	100.00	55.70	155.70	55.70	54.30
2	110	50.00	52.80	102.80	49.90	60.10
3	110	33.33	51.30	84.63	48.30	61.70
4	110	25.00	51.20	76.20	50.90	59.10
5	110	20.00	52.50	72.50	57.70	52.30
6	110	16.67	55.20	71.87	68.70	41.30
7	110	14.29	59.30	73.59	83.90	26.10
8	110	12.50	64.80	77.30	103.30	6.70
9	110	11.11	71.70	82.81	126.90	-16.90
10	110	10.00	80.00	90.00	154.70	-44.70
11	110	9.09	89.70	98.79	186.70	-76.70
12	110	8.33	100.80	109.13	222.90	-112.90



Economic Profit, Normal Profit, Loss, and Shutdown

- In the following table, the market price has fallen to \$58.
 - How much should the firm produce in order to maximize profits?
 - Why?
 - Should the firm shut down and produce nothing?

Economic Profit, Normal Profit, Loss, and Shutdown

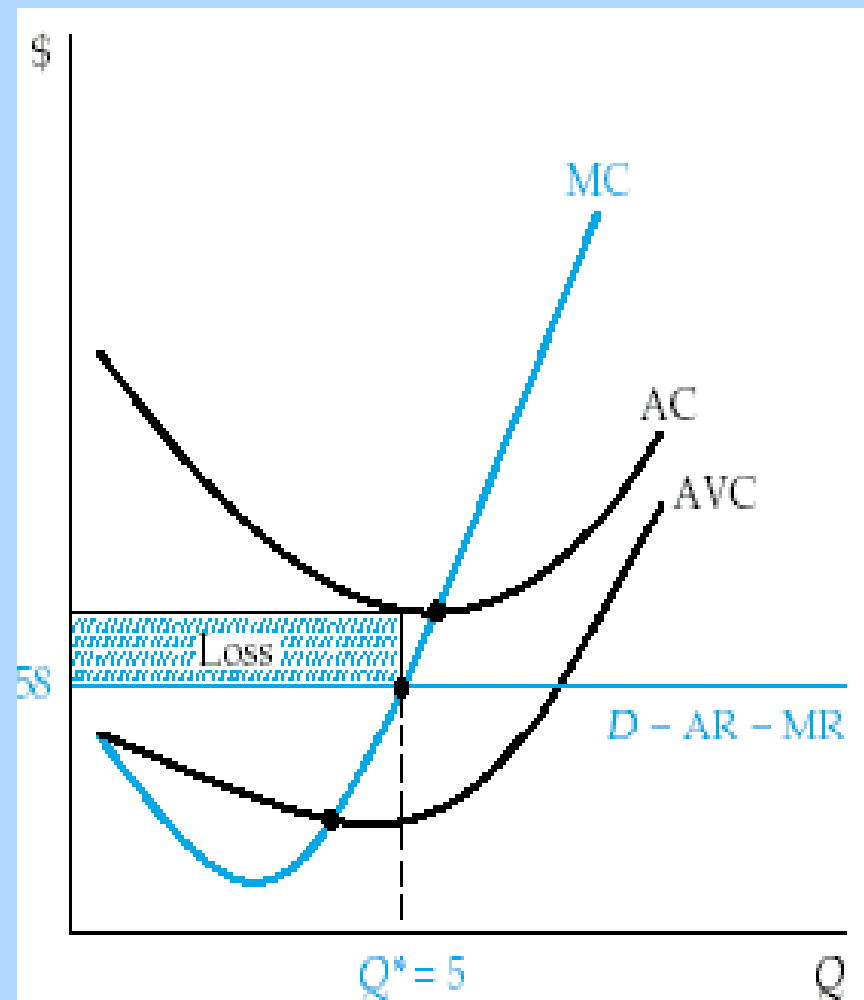
QUANTITY (Q)	MARGINAL REVENUE (MR = P = AR)	AVERAGE FIXED COST (AFC)	AVERAGE VARIABLE COST (AVC)	AVERAGE TOTAL COST (AC)	MARGINAL COST (MC)	MARGINAL PROFIT (M π)	TOTAL PROFIT OR LOSS (Q[P - AC])
0	58						-100.00
1	58	100.00	55.70	155.70	55.70	2.30	-97.70
2	58	50.00	52.80	102.80	49.90	8.10	-89.60
3	58	33.33	51.30	84.63	48.30	9.70	-79.89
4	58	25.00	51.20	76.20	50.90	7.10	-72.80
5	58	20.00	52.50	72.50	57.70	0.30	-72.50
6	58	16.67	55.20	71.87	68.70	-10.70	-83.22
7	58	14.29	59.30	73.59	83.90	-25.90	-109.13
8	58	12.50	64.80	77.30	103.30	-45.30	-154.44
9	58	11.11	71.70	82.81	126.90	-68.90	-223.29
10	58	10.00	80.00	90.00	154.70	-96.70	-320.00
11	58	9.09	89.70	98.79	186.70	-128.70	-448.69
12	58	8.33	100.80	109.13	222.90	-164.90	-613.56

Economic Profit, Normal Profit, Loss, and Shutdown

QUANTITY (Q)	MARGINAL REVENUE (MR = P = AR)	AVERAGE FIXED COST (AFC)	AVERAGE VARIABLE COST (AVC)	AVERAGE TOTAL COST (AC)	MARGINAL COST (MC)	MARGINAL PROFIT (M π)	TOTAL PROFIT OR LOSS (Q[P - AC])
0	58						-100.00
1	58	100.00	55.70	155.70	55.70	2.30	-97.70
2	58	50.00	52.80	102.80	49.90	8.10	-89.60
3	58	33.33	51.30	84.63	48.30	9.70	-79.89
4	58	25.00	51.20	76.20	50.90	7.10	-72.80
5	58	20.00	52.50	72.50	57.70	0.30	-72.50
6	58	16.67	55.20	71.87	68.70	-10.70	-83.22
7	58	14.29	59.30	73.59	83.90	-25.90	-109.13
8	58	12.50	64.80	77.30	103.30	-45.30	-154.44
9	58	11.11	71.70	82.81	126.90	-68.90	-223.29
10	58	10.00	80.00	90.00	154.70	-96.70	-320.00
11	58	9.09	89.70	98.79	186.70	-128.70	-448.69
12	58	8.33	100.80	109.13	222.90	-164.90	-613.56

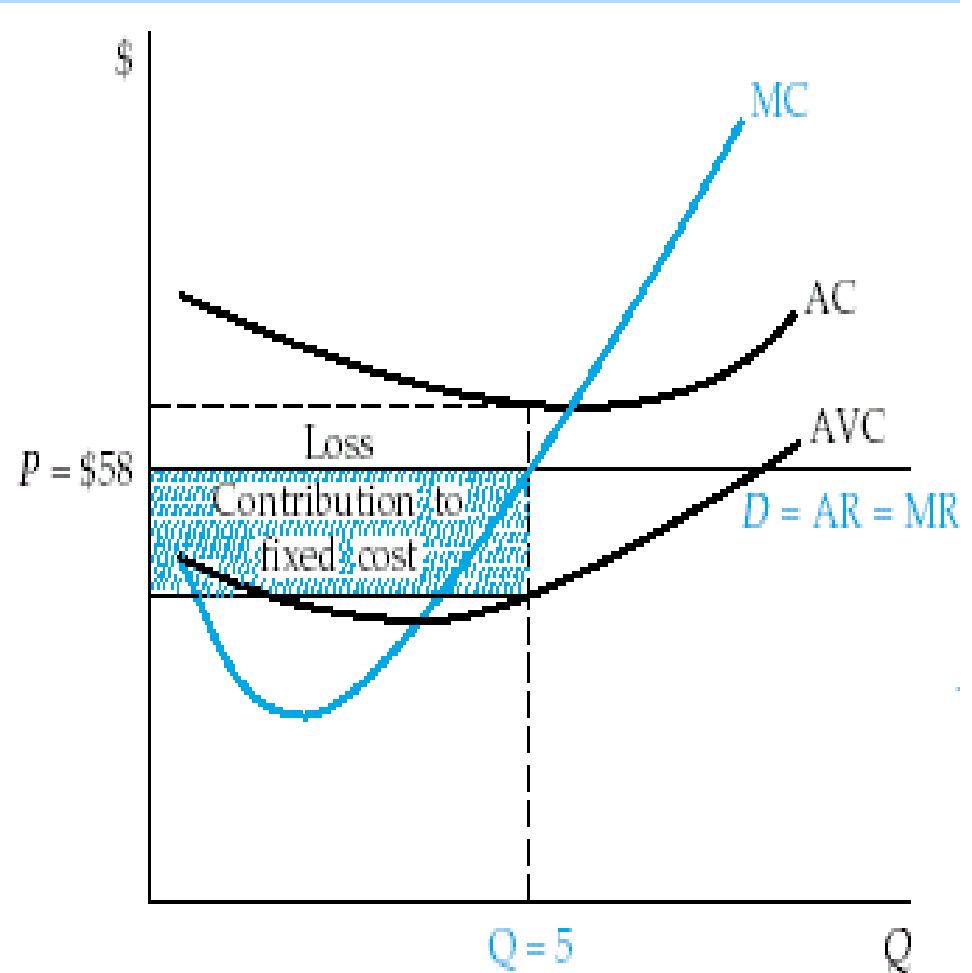
Economic Profit, Normal Profit, Loss, and Shutdown

- Graphically.
- The firm incurs a loss. At the optimum output level price is below average cost.
- However, since price is greater than average variable cost, the firm is better off producing in the short run. Why?



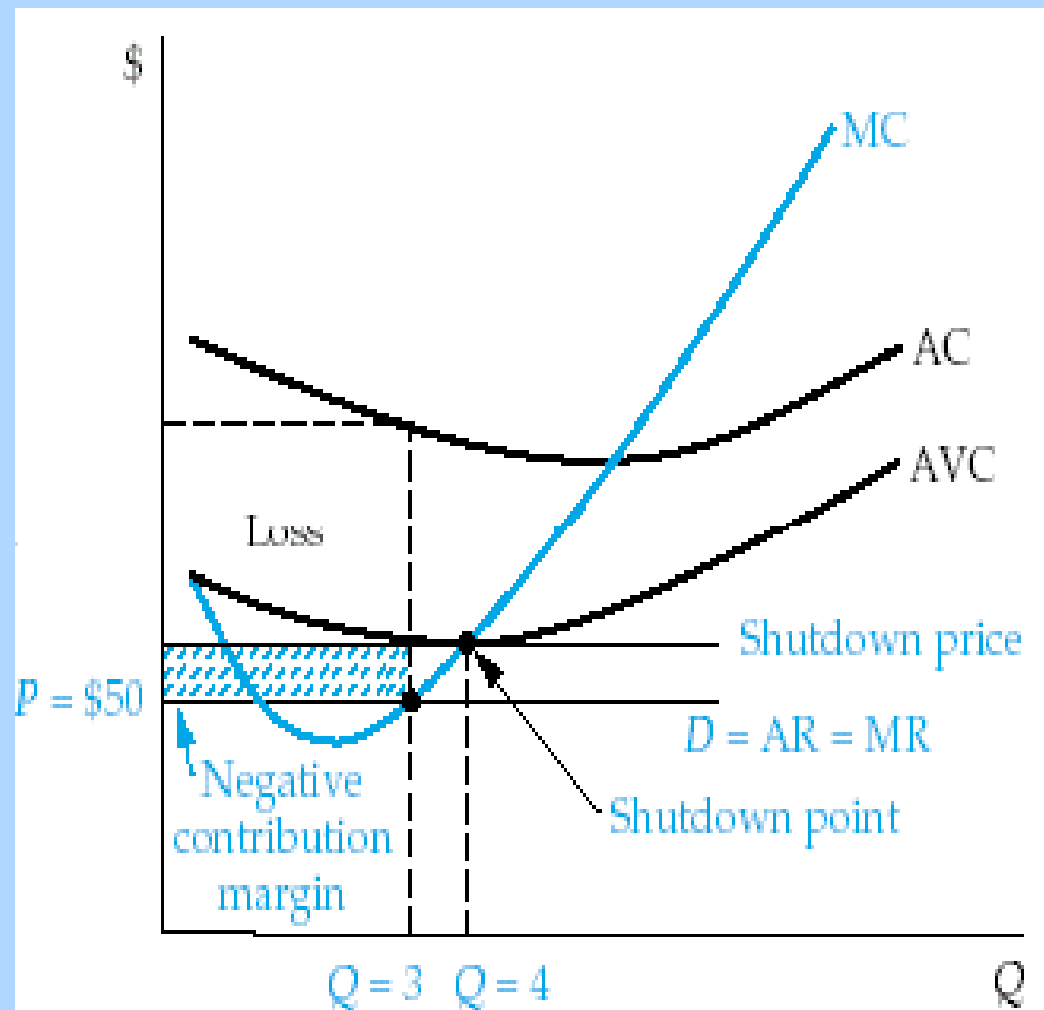
Economic Profit, Normal Profit, Loss, and Shutdown

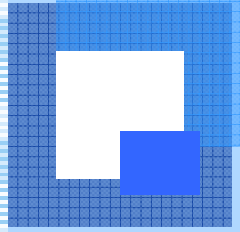
- Contribution Margin
 - The amount by which total revenue exceeds total variable cost.
 - $= TR - TVC$
 - If the contribution margin is positive, the firm should continue to produce in the short run.



Economic Profit, Normal Profit, Loss, and Shutdown

- Should the firm always operate at a loss in the short run?
- In the graph, the price has fallen to \$50. How much output should the firm produce?
- Why?



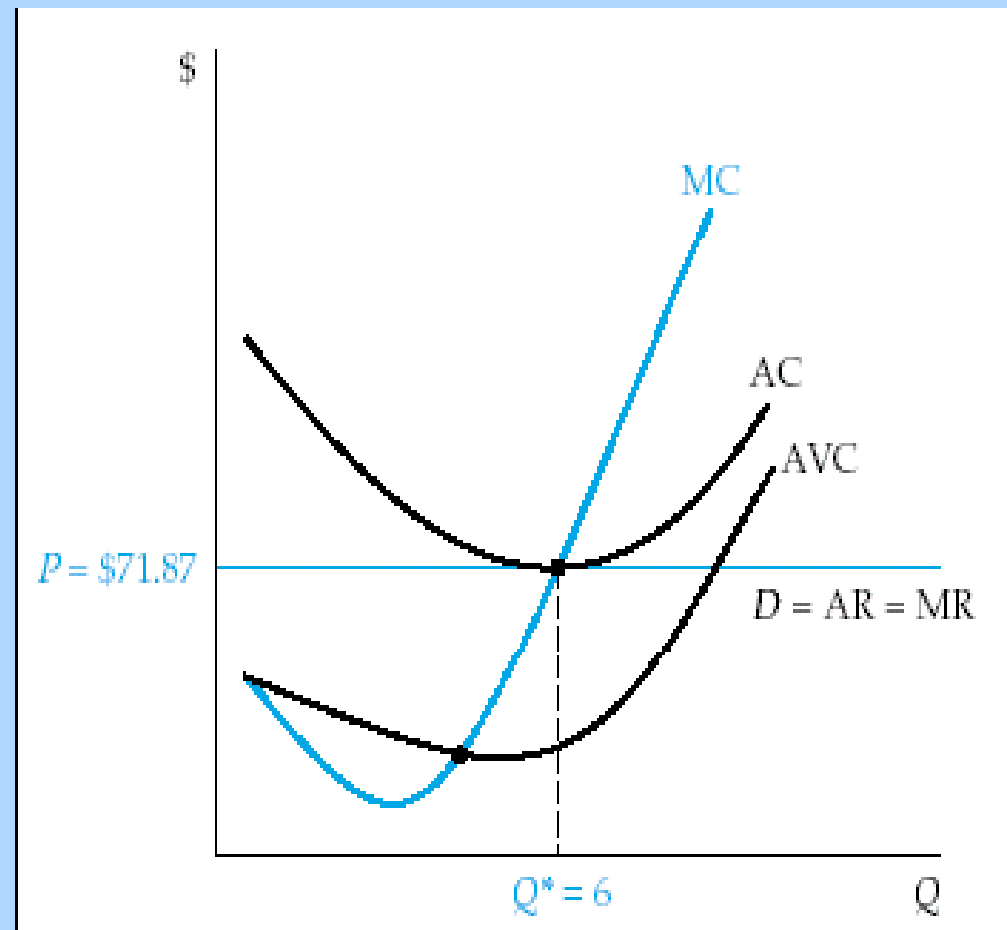


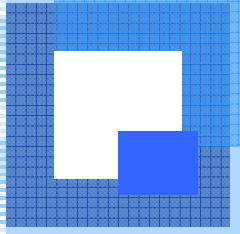
Economic Profit, Normal Profit, Loss, and Shutdown

- The shutdown point is the lowest price at which the firm would still produce.
- At the shutdown point, the price is equal to the minimum point on the AVC.
- If the price falls below the shutdown point, revenues fail to cover the fixed costs and the variable costs.
- The contribution margin is negative.
- The firm would be better off if it shut down and just paid its fixed costs.

Economic Profit, Normal Profit, Loss, and Shutdown

- What are the firm's profits in the graph at the right?
- Normal Profits
- $TR = TC$

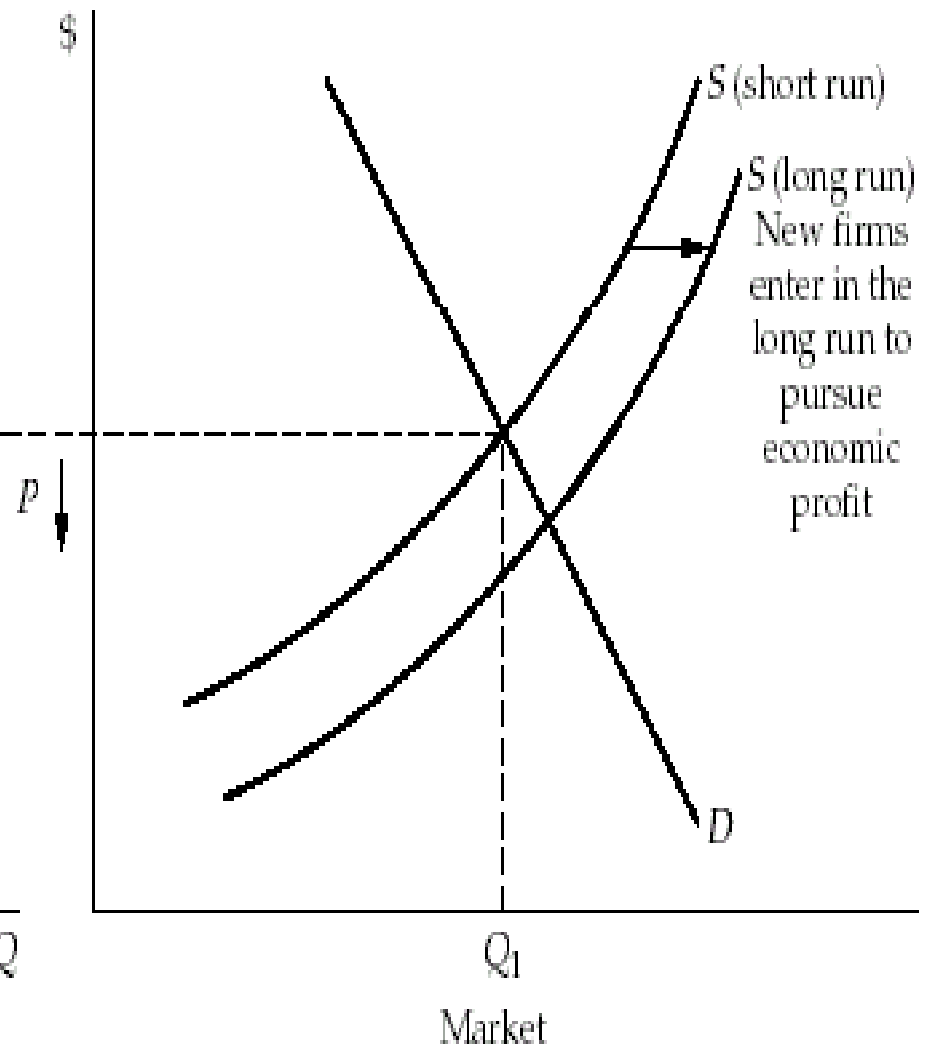
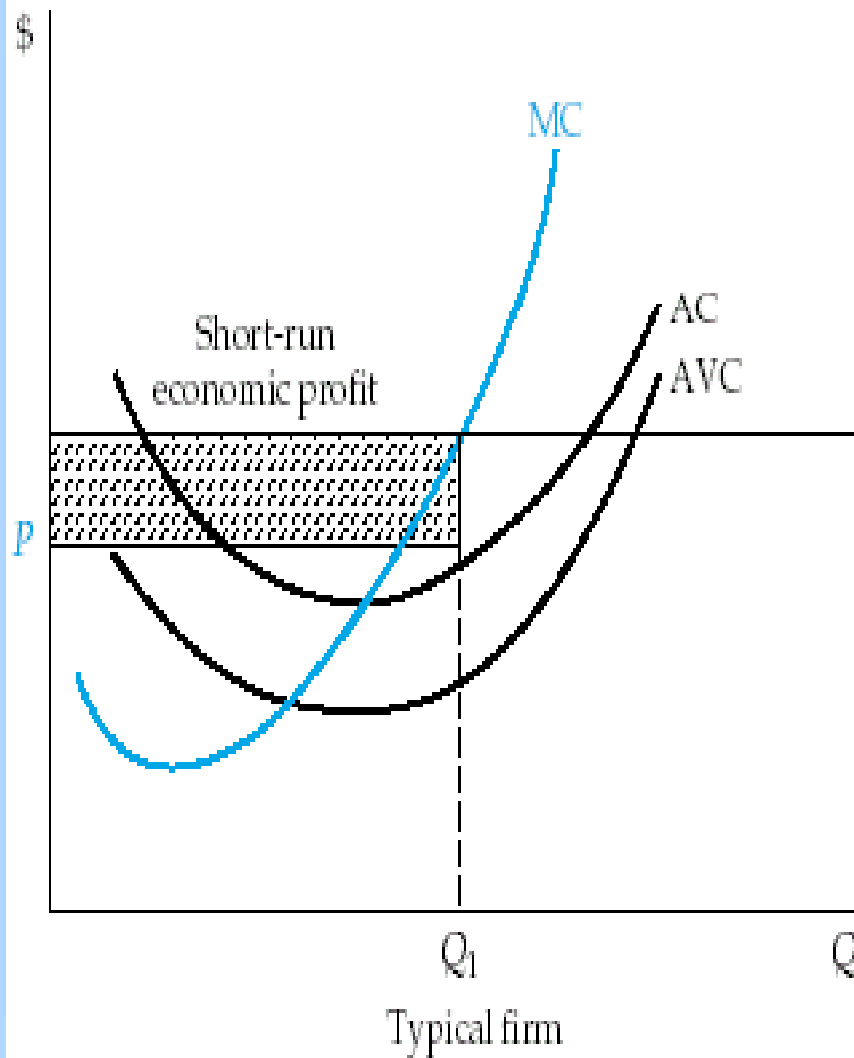


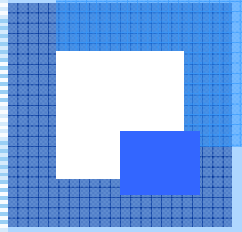


The Competitive Market in the Long Run

- In the long run, the price in the competitive market will settle at the point where firms earn a normal profit.
- Economic profit invites entry of new firms (why?) which shifts the supply curve to the right, puts downward pressure on price and reduces profits.

The Competitive Market in the Long Run

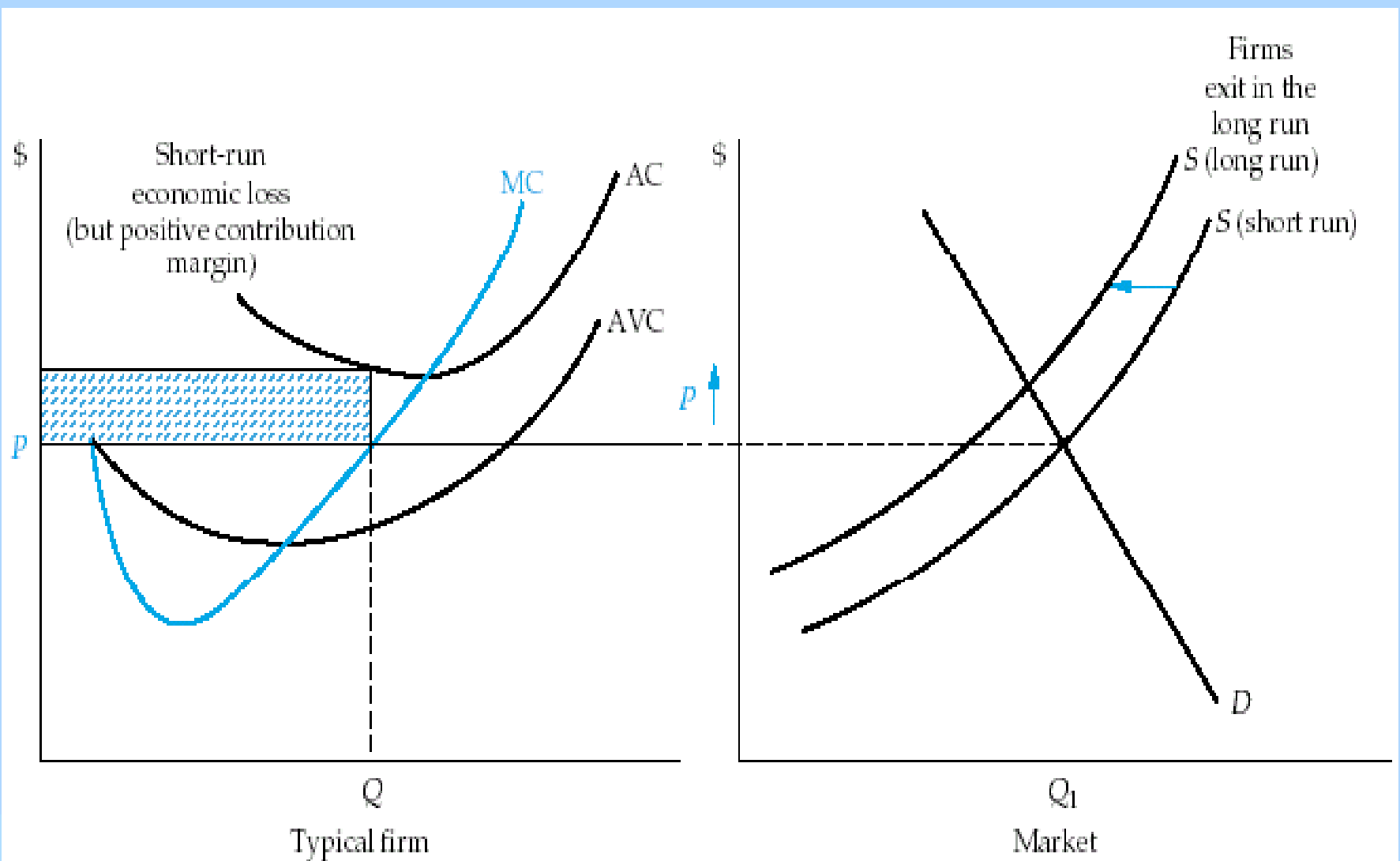


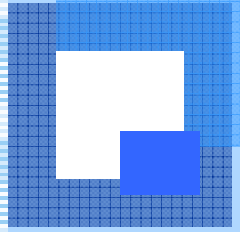


The Competitive Market in the Long Run

- Economic loss encourages exit of existing firms (why?) which shifts the supply curve to the left, puts upward pressure on price and increases profits.

The Competitive Market in the Long Run



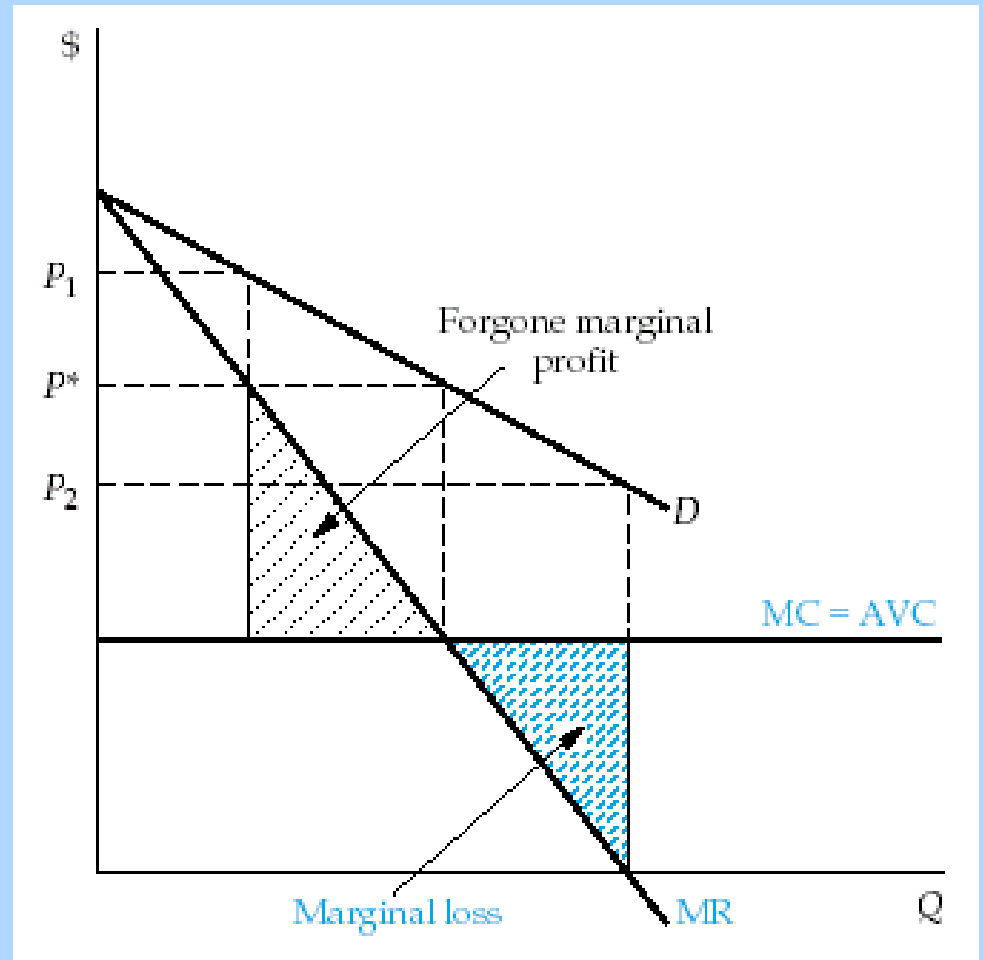


Pricing and Output Decisions in Monopoly Markets

- A monopoly market consists of one firm.
- The firm *is* the market.
- Power to establish any price it wants.
- The firm's ability to set price is limited by the demand curve for its product, and in particular, the price elasticity of demand.

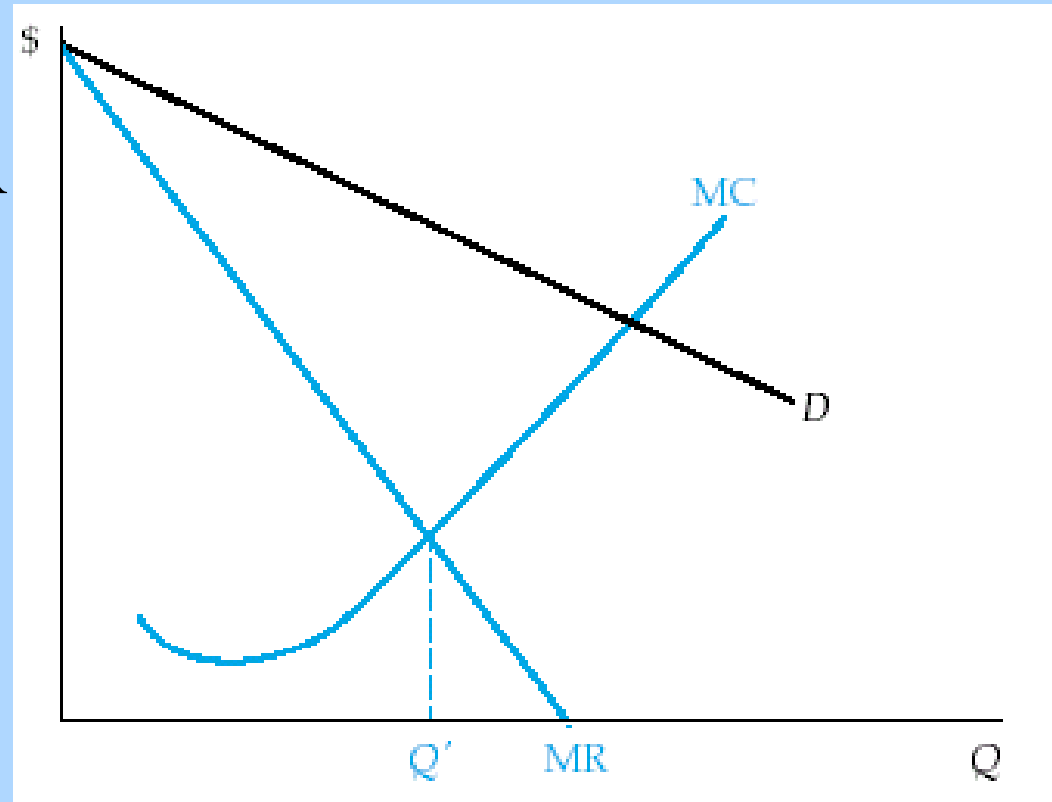
Pricing and Output Decisions in Monopoly Markets

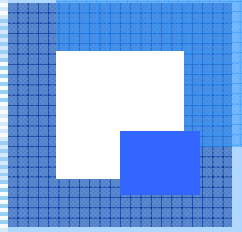
- In the graph, assume
 - Demand is linear which implies that MR is linear and twice as steep.
 - MC is constant.
- How much should the firm produce to maximize profit?



Pricing and Output Decisions in Monopoly Markets

- In the graph, assume
 - Demand is linear which implies that MR is linear and twice as steep.
 - Diminishing returns.
- How much should the firm produce to maximize profit?





Pricing and Output Decisions in Monopoly Markets

- Using the information in the following table, determine how much the firm should produce in order to maximize profits.

Pricing and Output Decisions in Monopoly Markets

QUANTITY (Q)	PRICE (P)	TOTAL REVENUE (TR)	MARGINAL REVENUE (MR)	AVERAGE		MARGINAL COST (MC)	TOTAL PROFIT (π)
				TOTAL COST (AC)	TOTAL COST (TC)		
0	180	0				100.00	-100.00
1	170	170	170	155.70	155.70	55.70	14.30
2	160	320	150	102.80	205.60	49.90	114.40
3	150	450	130	84.63	253.90	48.30	196.10
4	140	560	110	76.20	304.80	50.90	255.20
5	130	650	90	72.50	362.50	57.70	287.50
6	120	720	70	71.87	431.20	68.70	288.80
7	110	770	50	73.59	515.10	83.90	254.90
8	100	800	30	77.30	618.40	103.30	181.60
9	90	810	10	82.81	745.30	126.90	64.70
10	80	800	-10	90.00	900.00	154.70	-100.00
11	70	770	-30	98.79	1086.70	186.70	-316.70
12	60	720	-50	109.13	1309.60	222.90	-589.60

Pricing and Output Decisions in Monopoly Markets

QUANTITY (Q)	PRICE (P)	TOTAL REVENUE (TR)	MARGINAL REVENUE (MR)	AVERAGE		MARGINAL COST (MC)	TOTAL PROFIT (π)
				TOTAL COST (AC)	TOTAL COST (TC)		
0	180	0				100.00	-100.00
1	170	170	170	155.70	155.70	55.70	14.30
2	160	320	150	102.80	205.60	49.90	114.40
3	150	450	130	84.63	253.90	48.30	196.10
4	140	560	110	76.20	304.80	50.90	255.20
5	130	650	90	72.50	362.50	57.70	287.50
6	120	720	70	71.87	431.20	68.70	288.80
7	110	770	50	73.59	515.10	83.90	254.90
8	100	800	30	77.30	618.40	103.30	181.60
9	90	810	10	82.81	745.30	126.90	64.70
10	80	800	-10	90.00	900.00	154.70	-100.00
11	70	770	-30	98.79	1086.70	186.70	-316.70
12	60	720	-50	109.13	1309.60	222.90	-589.60

Pricing and Output Decisions in Monopoly Markets

- Graphically:
- Set output where $MR=MC$
- At this output, read the price to set off of the demand curve.
- Profits = rectangle ABCD

