Firms in Competitive Markets

WHAT IS A COMPETITIVE MARKET?

•A perfectly *competitive market* has the following characteristics:
•There are many buyers and sellers in the market.
•The goods offered by the various sellers are largely the same.
•Firms can freely enter or exit the market.
•As a result of its characteristics, the perfectly competitive market has the following outcomes:
•The actions of any single buyer or seller in the market have a negligible impact on the market price.
•Each buyer and seller takes the market price as given.
•A competitive market has many buyers and sellers trading identical products so that each buyer and seller is a price taker.
•Buyers and sellers must accept the price determined by the market.

The Revenue of a Competitive Firm

•Total revenue for a firm is the *selling price* times the *quantity sold*.

$$TR = (P \times Q)$$

•Total revenue is proportional to the amount of output.
•*Average revenue* tells us how much revenue a firm receives for the typical unit sold.
•Average revenue is total revenue divided by the quantity sold.
•In perfect competition, average revenue equals the price of the good.

$$\text{Average Revenue} = \frac{\text{Total revenue}}{\text{Quantity}}$$

$$= \frac{\text{Price} \times \text{Quantity}}{\text{Quantity}}$$

$$= \text{Price}$$

•*Marginal revenue* is the change in total revenue from an additional unit sold.
MR =DTR/ DQ
•For competitive firms, marginal revenue equals the price of the good.

Table 1 Total, Average, and Marginal Revenue for a Competitive Firm

Quantity	Price	Total Revenue	Average Revenue	Marginal Revenue
(*Q*)	(*P*)	($TR = P \times Q$)	($AR = TR/Q$)	($MR = \Delta TR/\Delta Q$)
1 gallon	$6	$ 6	$6	
				$6
2	6	12	6	
				6
3	6	18	6	
				6
4	6	24	6	
				6
5	6	30	6	
				6
6	6	36	6	
				6
7	6	42	6	
				6
8	6	48	6	

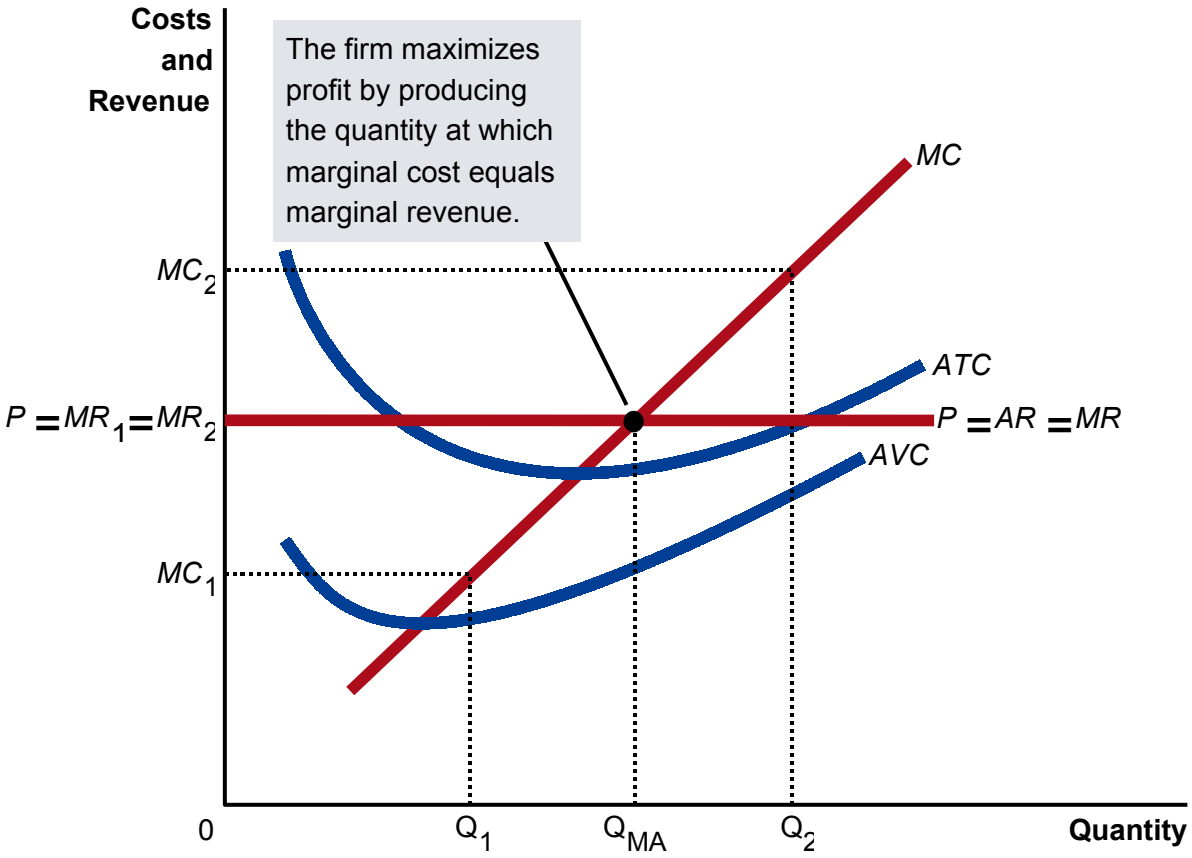
PROFIT MAXIMIZATION AND THE COMPETITIVE FIRM'S SUPPLY CURVE

•The goal of a competitive firm is to maximize profit.

•This means that the firm will want to produce the quantity that maximizes the *difference between total revenue and total cost*.

Table 2 Profit Maximization: A Numerical Example

Quantity	Total Revenue	Total Cost	Profit	Marginal Revenue	Marginal Cost	Change in Profit
(*Q*)	(*TR*)	(*TC*)	(*TR* – *TC*)	($MR = \Delta TR/\Delta Q$)	($MC = \Delta TC/\Delta Q$)	(*MR* – *MC*)
0 gallons	$ 0	$ 3	−$3			
				$6	$2	$4
1	6	5	1			
				6	3	3
2	12	8	4			
				6	4	2
3	18	12	6			
				6	5	1
4	24	17	7			
				6	6	0
5	30	23	7			
				6	7	−1
6	36	30	6			
				6	8	−2
7	42	38	4			
				6	9	−3
8	48	47	1			

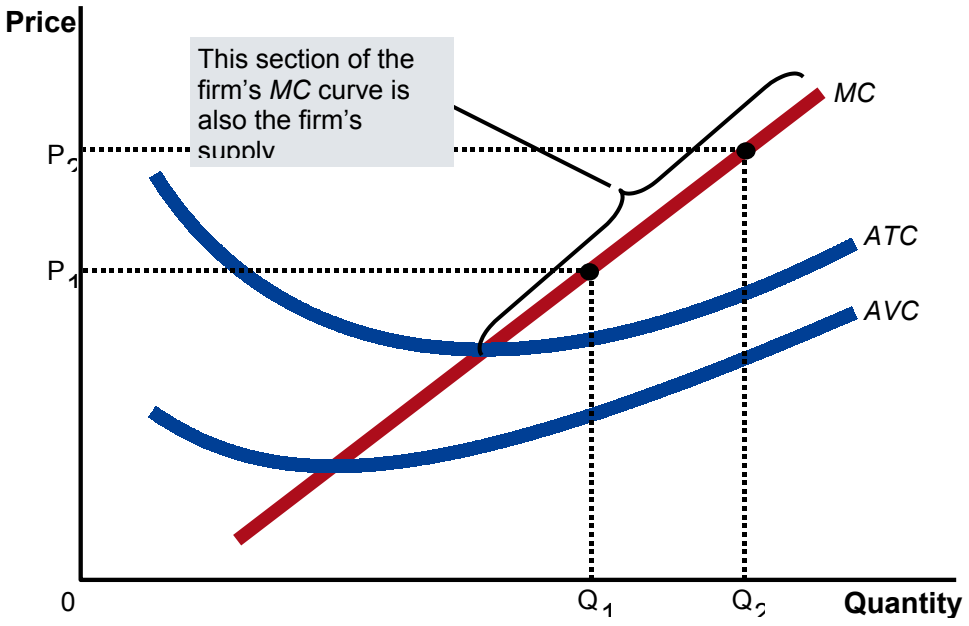


•Profit maximization occurs at the quantity where *marginal revenue equals marginal cost*.

•**When *MR* > *MC* ê *in*crease *Q***

•**When *MR* < *MC* ê *de*crease *Q***

•**When *MR* = *MC* ê Profit is maximized.**



The Firm's Short-Run Decision to Shut Down

•A *shutdown* refers to a short-run decision not to produce anything during a specific period of time because of current market conditions.
•*Exit* refers to a long-run decision to leave the market.
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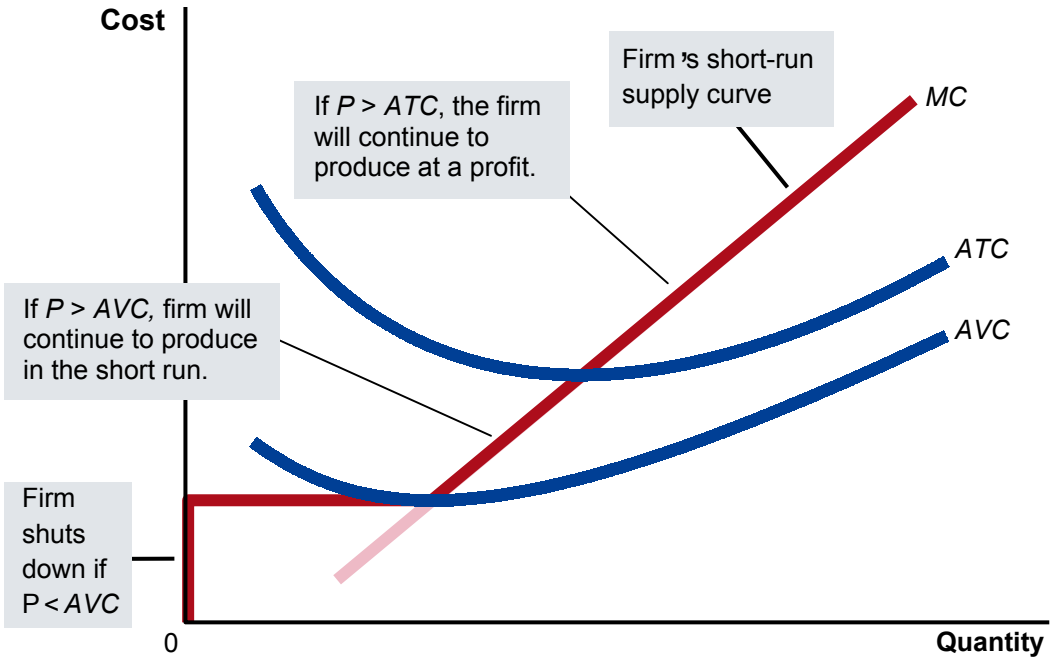
•*Exit* refers to a long-run decision to leave the market.
•The firm considers its *sunk costs* when deciding to exit, but ignores them when deciding whether to shut down.
•*Sunk costs* are costs that have already been committed and cannot be recovered.
•The firm shuts down if the revenue it gets from producing is less than the variable cost of production.
•Shut down if $TR < VC$
•Shut down if $TR/Q < VC/Q$
•Shut down if $P < AVC$

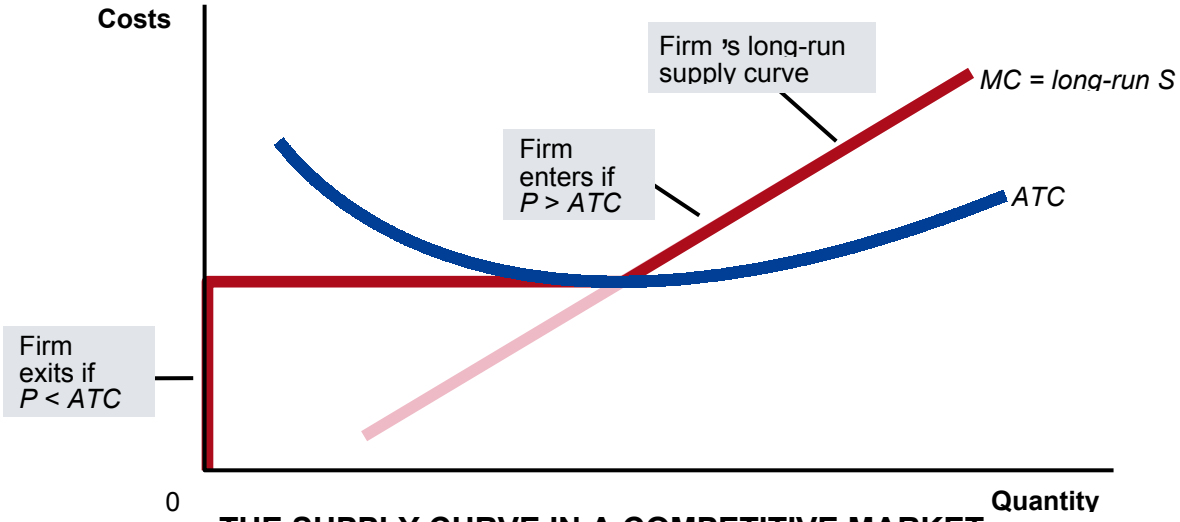


•The portion of the marginal-cost curve that lies above average variable cost is the competitive firm's *short-run supply curve*.

The Firm's Long-Run Decision to Exit or Enter a Market

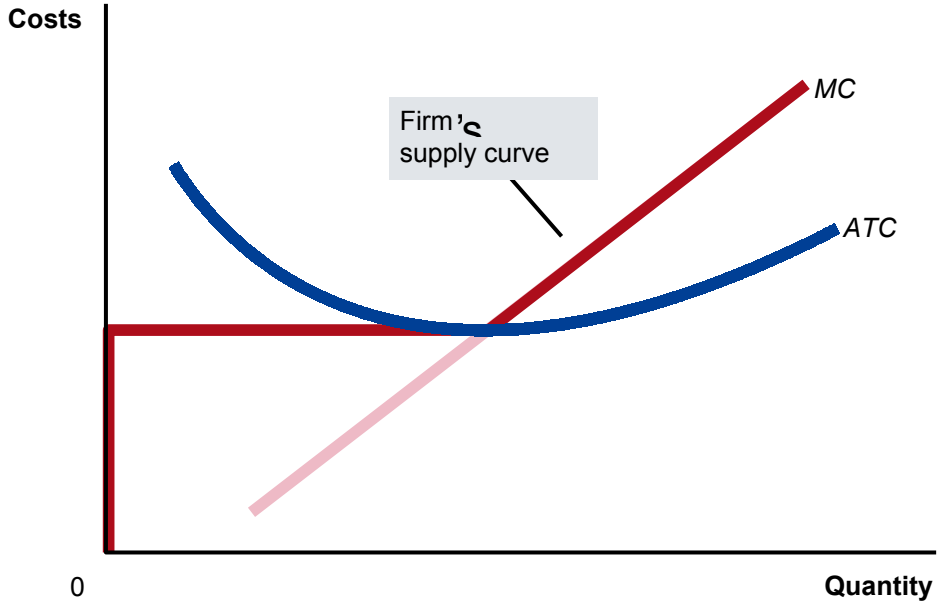
•In the long run, the firm exits if the revenue it would get from producing is less than its total cost.
•Exit if $TR < TC$
•Exit if $TR/Q < TC/Q$
•Exit if $P < ATC$

•A firm will enter the industry if such an action would be profitable.
•Enter if *TR* > *TC*
•Enter if *TR/Q* > *TC/Q*
•Enter if *P* > *ATC*



THE SUPPLY CURVE IN A COMPETITIVE MARKET

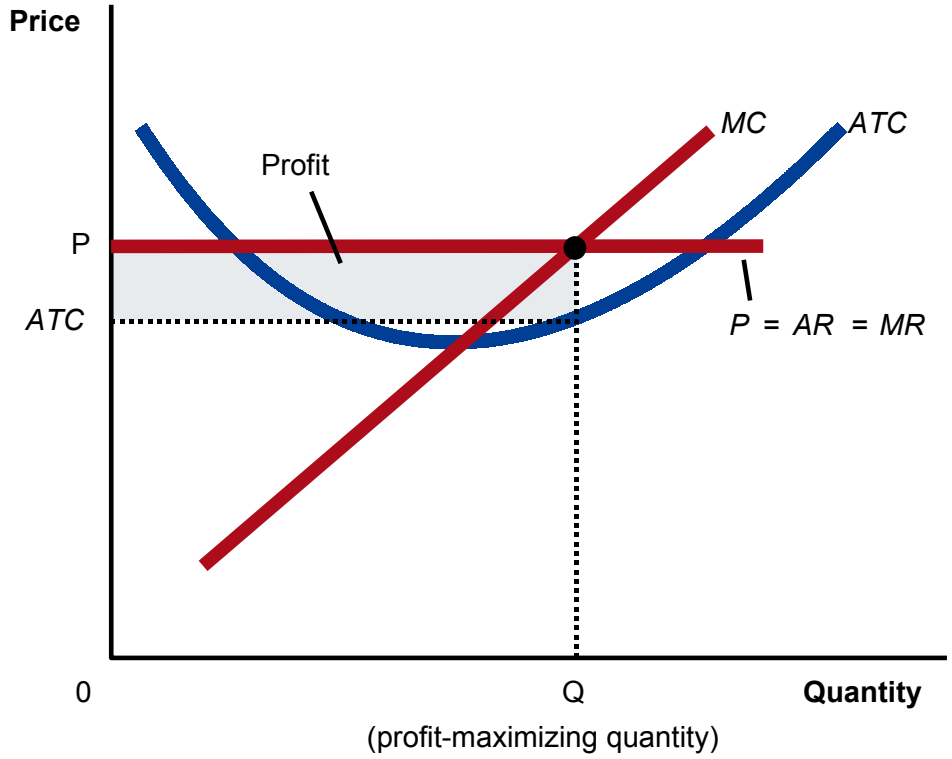
•The competitive firm's long-run supply curve is the portion of its marginal-cost curve that lies above average total cost.



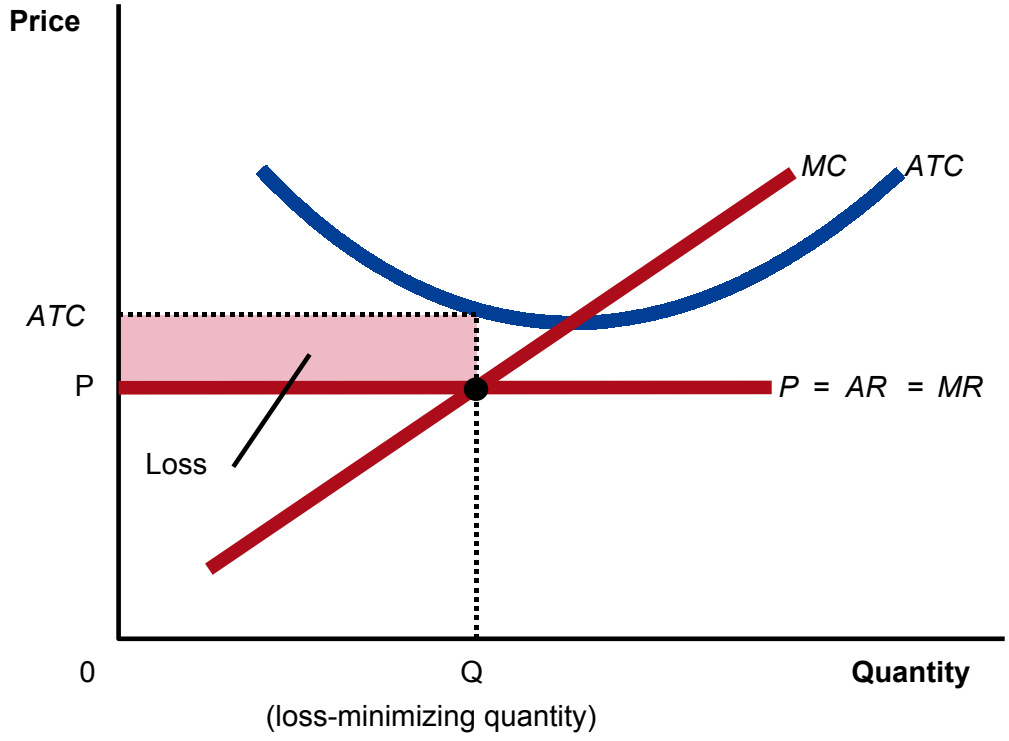
•Short-Run Supply Curve•The portion of its marginal cost curve that lies above average variable cost.

•Long-Run Supply Curve•The marginal cost curve above the minimum point of its average total cost curve.

(a) A Firm with Profits



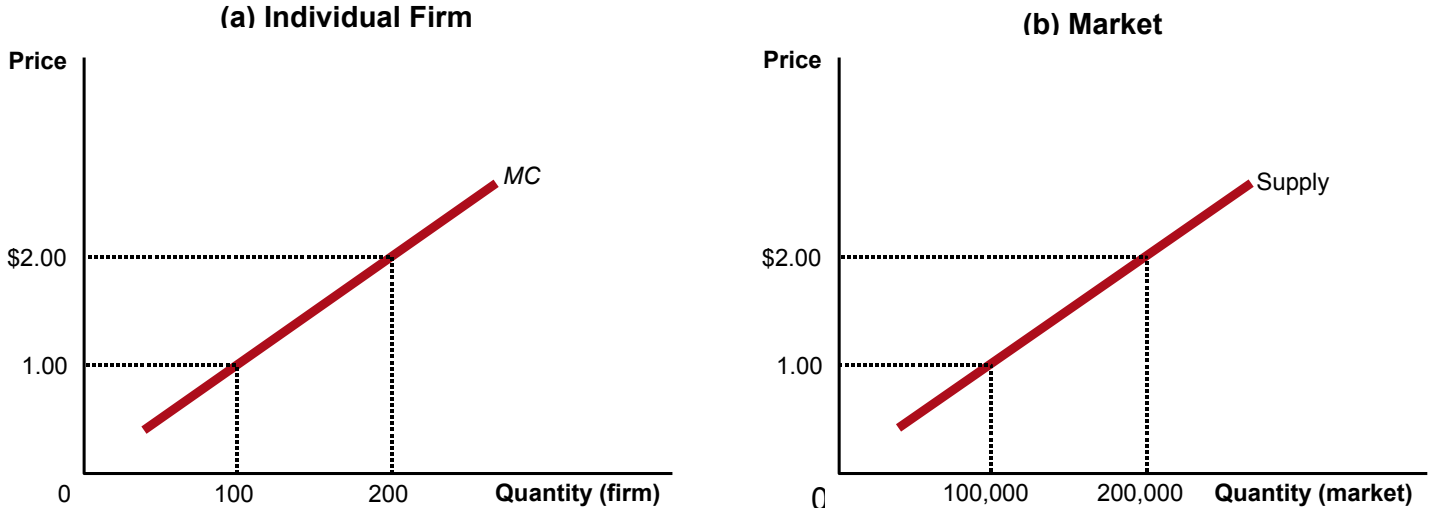
(b) A Firm with Losses



•Market supply equals the sum of the quantities supplied by the individual firms in the market.

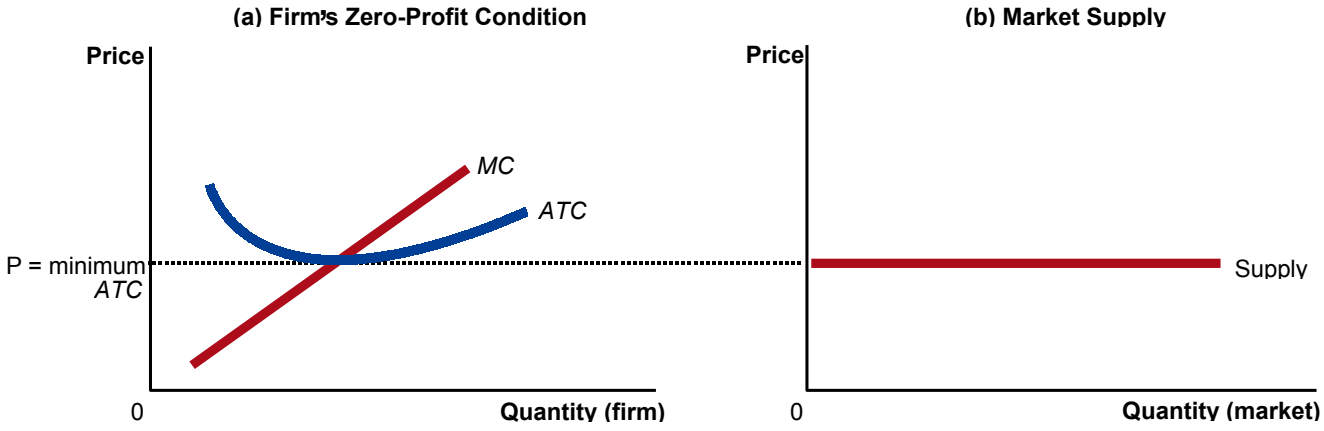
The Short Run: Market Supply with a Fixed Number of Firms

•For any given price, each firm supplies a quantity of output so that its marginal cost equals price.
•The market supply curve reflects the individual firms' marginal cost curves.



The Long Run: Market Supply with Entry and Exit

•Firms will enter or exit the market until profit is driven to zero.
•In the long run, price equals the minimum of average total cost.
•The long-run market supply curve is horizontal at this price.



•At the end of the process of entry and exit, firms that remain must be making zero economic profit.

•The process of entry and exit ends only when price and average total cost are driven to equality.
•Long-run equilibrium must have firms operating at their efficient scale.

Why Do Competitive Firms Stay in Business If They Make Zero Profit?

•Profit equals total revenue minus total cost.
•Total cost includes all the opportunity costs of the firm.
•In the zero-profit equilibrium, the firm's revenue compensates the owners for the time and money they expend to keep the business going.

Summary

•Because a competitive firm is a price taker, its revenue is proportional to the amount of output it produces.
•The price of the good equals both the firm's average revenue and its marginal revenue.
•To maximize profit, a firm chooses the quantity of output such that marginal revenue equals marginal cost.
•This is also the quantity at which price equals marginal cost.
•Therefore, the firm's marginal cost curve is its supply curve.
•In the short run, when a firm cannot recover its fixed costs, the firm will choose to shut down temporarily if the price of the good is less than average variable cost.
•In the long run, when the firm can recover both fixed and variable costs, it will choose to exit if the price is less than average total cost.
•In a market with free entry and exit, profits are driven to zero in the long run and all firms produce at the efficient scale.
•Changes in demand have different effects over different time horizons.
•In the long run, the number of firms adjusts to drive the market back to the zero-profit equilibrium.

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N. Gregory Mankiw. 2007. *Principle of Economics*, 4th Edition, Thomson South-Western