

Market Structure: Perfect Competition

September 04, 2025

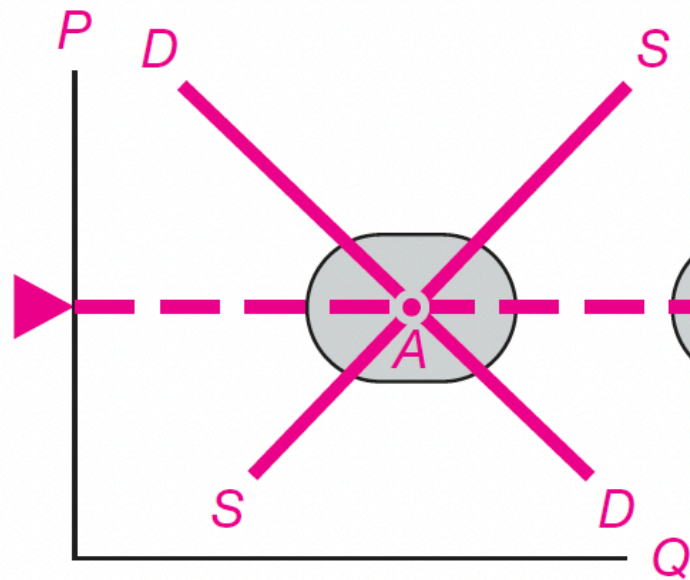
Competitive market

- Consider the market for milk
 - What is the likely impact on the demand if Amul raises the price of milk by, say, 10 per cent?
- Now, consider the electricity supply in Delhi
 - What if BSES raises electricity price?
- Characteristics of a perfectly competitive market
 - Many buyers and sellers
 - Homogenous product
- Consequence:
 - the actions of any single buyer or seller in the market have a negligible impact on the market price
 - any single firm or consumer is too small to affect the price (think of a producer of rice)
 - In other words, each buyer and seller is the price taker
- No barriers to entry: free entry and exit

Supply behavior of firms (1)

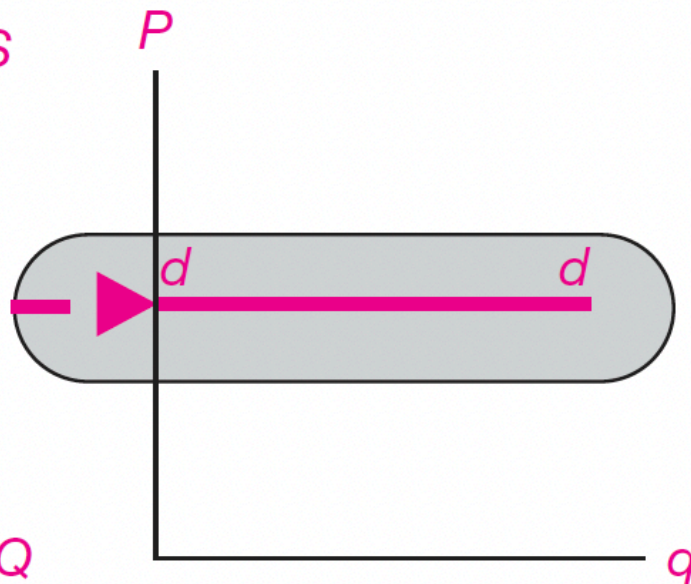
- Firms maximize their profit
 - And, accordingly decide the optimal level of output
- Since the buyers take the price as given (see the previous slide), the demand curve facing a **single** competitive firm is completely elastic
 - The demand curve for a firm is horizontal because a perfect competitor has such a small fraction of the market that it can sell all it wants at the market price
 - However, the industry demand curve, which is obtained by aggregating the demand of the firms, may be inelastic

(a) Industry



Industry output

(b) Firm



Firm output

FIGURE 8-1. Demand Curve Is Completely Elastic for a Perfectly Competitive Firm

Supply behavior of firms (2)

- Price and revenue under perfect competition
 - Since a competitive firm cannot affect the price, the extra revenue earned by the firm from selling an extra unit equals the price
 - Suppose the market price is Rs 40 and the firm is selling 100 units. If it decides to sell 101 units, its revenue increases by Rs 40
 - In other words, the price equals marginal revenue
 - $P = MR$
 - The demand curve of the firm, shown in panel (b), is also its marginal revenue curve

How much a firm should supply?

- Firm will maximize its profit
 - Profit = total revenue – total cost
- The firm will compare the cost incurred on the production of the last unit with the revenue earned from it
 - The latter is known as marginal revenue (MR) and the former, marginal cost (MC)
- Optimal (or profit maximizing) output is achieved at $MR = MC$
- The firm will have an incentive to produce more as long as $MR > MC$

Supply decision

- Therefore, under perfect competition
 - $P = MR$ (the demand curve)
 - $MR = MC$ (profit maximizing condition)
 - $P = MC$ (determines the level of production)
- Graphical illustration
- What if a firm chooses the wrong output?
 - Say, the firm decides to produce at a level where $P > MC$ (to the left of the optimal quantity)
 - The former implies that $MR > MC$ and a profit maximizing firm can always make more profit by selling an additional unit until $P = MC$
- The profit maximizing firm sets its output at a level where marginal cost equals price

An example

- Suppose you are working for a company with the following cost structure [Quantity, Average Cost]
 - [500, 200] and [501, 201]
- Your company is producing (and selling) 500 units
 - There is a demand for an additional unit. The customer is willing to pay Rs 201. Will you accept the offer?

Tracing the supply curve

- Suppose the price increases from, say, P_1 to P_2 . What happens to the profit maximizing quantity of output?
- Likewise, if the price decreases from P_1 to P_3 what do we expect?
- Under perfect competition, the marginal cost curve is also the firm's supply curve
- However, the cost structure of the firm truncates the supply curve, and we shall discuss it subsequently

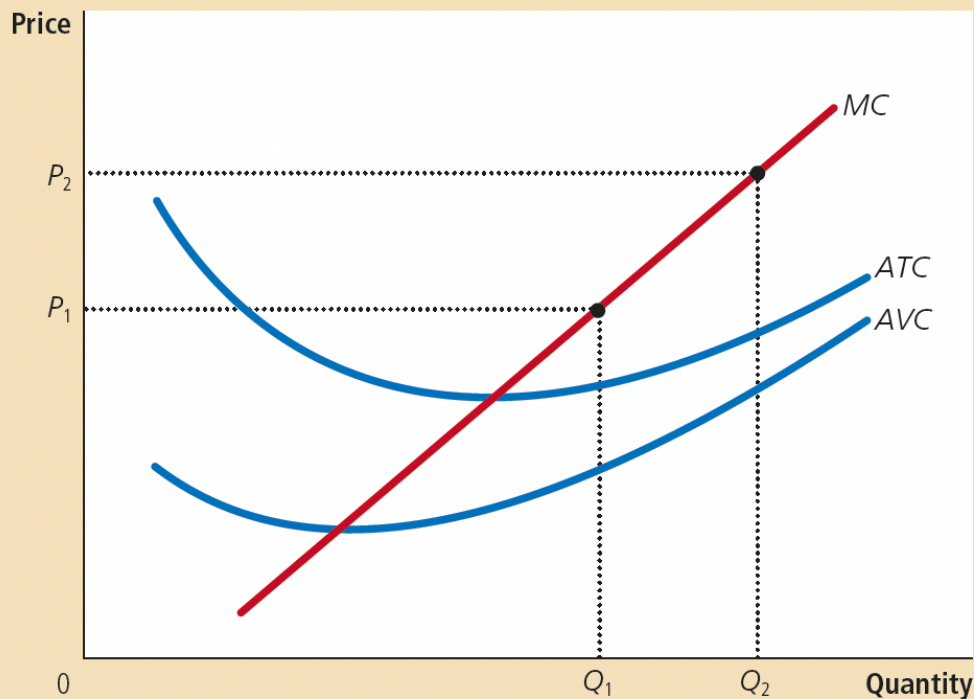


Figure 2

Marginal Cost as the Competitive Firm's Supply Curve

An increase in the price from P_1 to P_2 leads to an increase in the firm's profit-maximizing quantity from Q_1 to Q_2 . Because the marginal-cost curve shows the quantity supplied by the firm at any given price, it is the firm's supply curve.

Shut down and exit: concepts

- Shut down
 - Short run phenomenon
 - Because of market conditions, the firm decides not to produce for a specific period of time
- Exit
 - Long run decision
 - The firm decides to leave the market
- Difference
 - Fixed costs: need to be paid in shut down but not in the case of exit
 - Variable costs: Need not to be paid in the either case

The shut down condition

- Shut down means the firm loses all the revenue from sale of the product and saves the variable costs of production
- Thus, the firm shuts down if total revenue does not cover variable costs
 - $TR < TVC$
 - $AR < AVC$
 - $P < AVC$
- The firm loses money as it needs to pay the fixed costs but it would lose even more by staying open. The firm can reopen in the future if the market conditions change such that $P > AVC$
- Illustration and the supply curve

Have you ever walked into a restaurant for lunch and found it almost empty? Why, you might have asked, does the restaurant even bother to stay open? It might seem that the revenue from so few customers could not possibly cover the cost of running the restaurant.

In making the decision whether to open for lunch, a restaurant owner must keep in mind the distinction between fixed and variable costs. Many of a restaurant's costs—the rent, kitchen equipment, tables, plates, silverware, and so on—are fixed. Shutting down during lunch would not reduce these costs. In other words, these costs are sunk in the short run. When the owner is deciding whether to serve lunch, only the variable costs—the price of the additional food and the wages of the extra staff—are relevant. The owner shuts down the restaurant at lunchtime only if the revenue from the few lunchtime customers fails to cover the restaurant's variable costs.

Article

Shutdown Decision of Firms Based on Variable Costs and Demand: Empirical Evidence From the Forest Products Industry of Alabama

Hakan Uslu and Larry Teeter

Abstract

The forest products industry in Alabama, the second largest manufacturing sector of the state, has been experiencing a recession in production, number of establishments and employees since the mid-1990s. This study investigates the determinants of this decline in the industry, using a county-level panel dataset that spans the period between 1996 and 2012. Four sub-sectors were analyzed separately, including the logging, wood, paper, and furniture manufacturing sectors. Results suggest that increases in average variable cost, rather than decreases in demand, were more strongly associated with the recession as measured by the number of operating establishments. Decomposition analysis indicates that the cost of materials, rather than labor, contributes more to the decline in the number of forest sector establishments in the state. This could be because increases in labor costs, such as wage increases, are accompanied by increases in labor productivity.

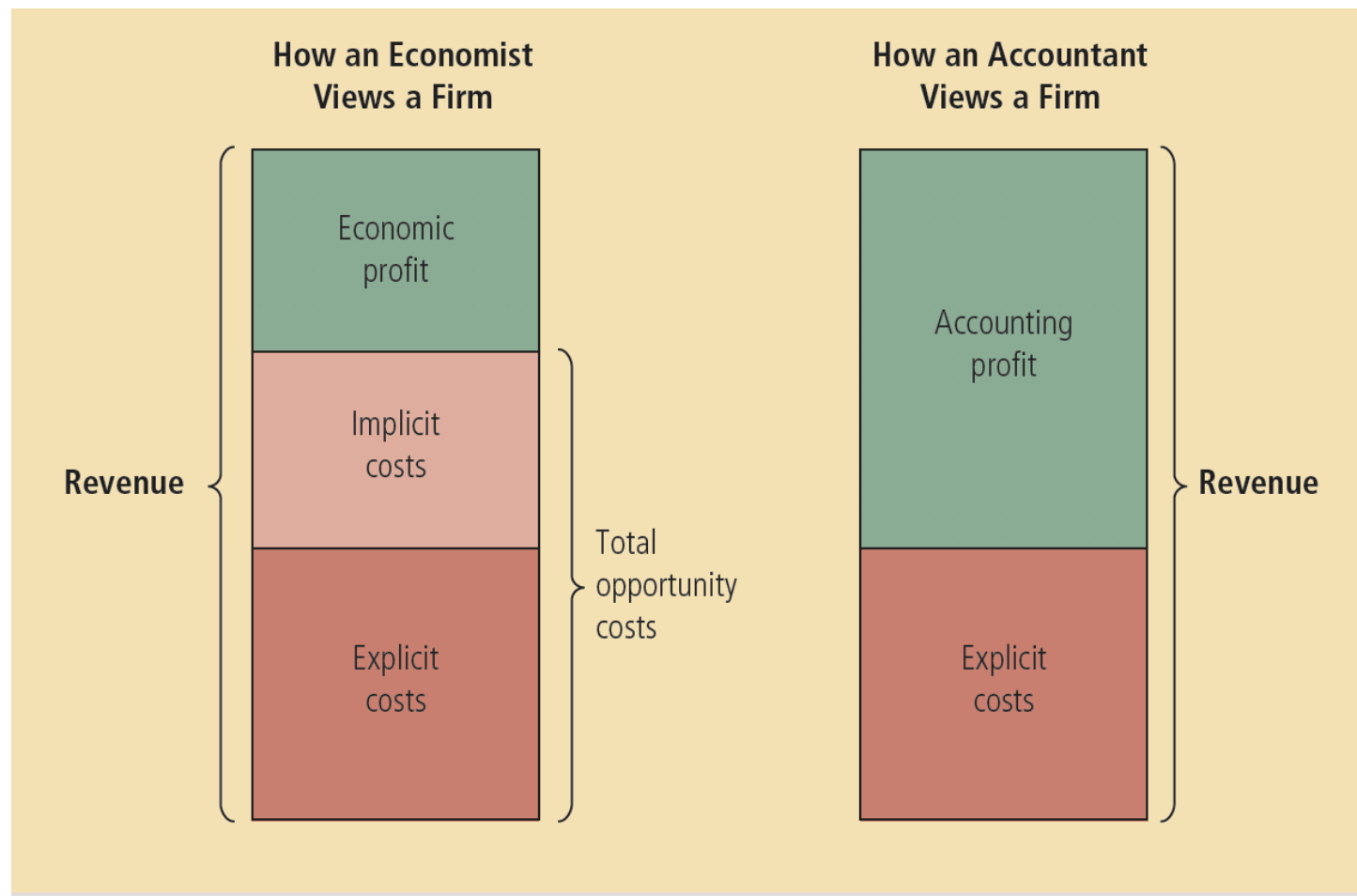
The exit (or entry) condition

- Exit decision: the firm will lose the revenue from sale and will save not just the variable costs but also the fixed costs
- Thus the firm exits if
 - $TR < TC$
 - $AR < AC$
 - $P < AC$
- Entry: $P > AC$
- Illustration and the supply curve

Profits

- Profit
 - $TR - TC$
 - $(AR - AC) * Q$
 - $(P - AC) * Q$
- Illustration
 - Positive profits
 - Negative profits
- In perfect competition, the firms earn zero economic profit (see the next slide)

Profit in accountancy and in economics

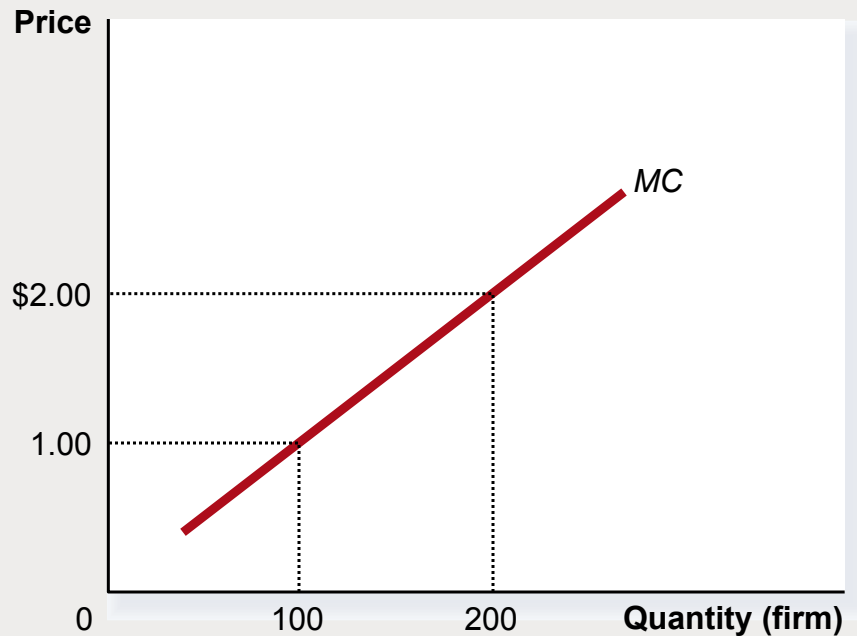


Market supply curve

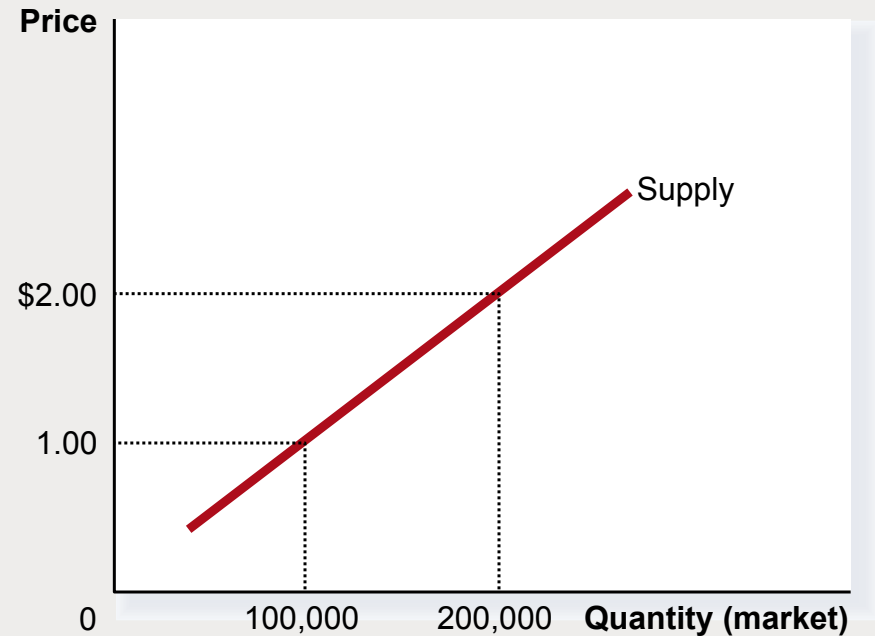
- Market supply = the sum of quantities supplied by the individual firms
- Short run: difficult for firms to enter and exit; thus, there are a fixed number of firms in the market
 - each firm supplies a quantity such that $P = MC$
 - as long as $P > AVC$ (the shut down condition), each firm's MC curve is its supply curve
 - market supply = the sum of the quantities supplied by the individual firms

A Market with 1000 firms; short-run

(a) Individual Firm Supply



(b) Market Supply

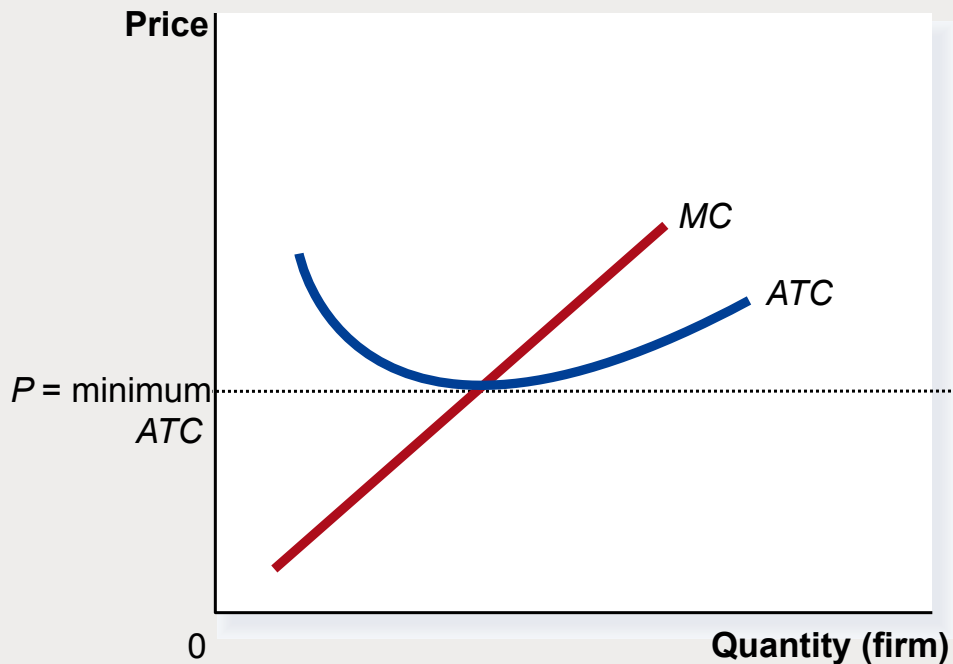


Market supply in the long run

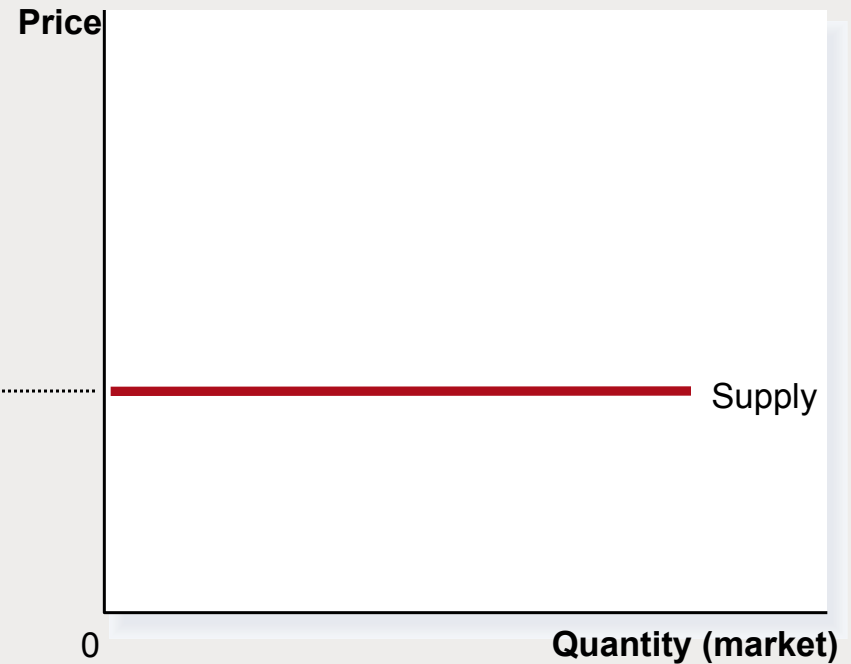
- Long run: depending on the market conditions, the number of firms can change
 - Firms have access to the same technology and the inputs (from the same market)
- Entry and exit decisions depend on the market incentives
 - If firms in an industry are earning profit, this will attract new firms and pull down the prices and profit
 - Likewise, if the firms are incurring losses, some existing firms will exit. This will pull up the prices and profit
- In the end, the (economic) profit of the firms that remain in the market is squeezed to zero
- In the long run, given free entry and exit,
 - there is only one price consistent with zero profit—the minimum of AC. Recall that profit = $(P - AC) \cdot Q$. The long-run market supply curve is horizontal at this price
- Also, at the point with minimum AC we have
 - $MC = AC$, which is consistent with $P = MC$
 - the efficient scale of production for the firms
- Why do firms stay in business despite making zero profit?
 - Total cost includes all the opportunity costs of the firm

Market supply in the long run

(a) Firm's Zero-Profit Condition



(b) Market Supply



Special cases

- General Rules (shift in demand or supply)
 - Demand:
 - An increase in demand for a commodity, given supply, raises the price of commodity
 - For most commodities, an increase in demand also increases the quantity demanded
 - Decrease in demand has opposite effects
 - Supply:
 - An increase in supply of a commodity, given demand, reduces the prices
 - The increase in supply also increases the quantity bought and sold
 - Decrease in supply has opposite effects

Constant cost industries

- Cost of production
 - Determined by the price of inputs (i.e., factors of production) used in the production process
- Constant cost industry
 - Cost of production does not change with the level of output
 - Production can be increased merely by duplicating inputs
 - Example: textile industry
- In the long run, the supply curve is horizontal line (at the constant per unit cost)
 - A rise in demand enhances the quantity supplied but does not affect the price

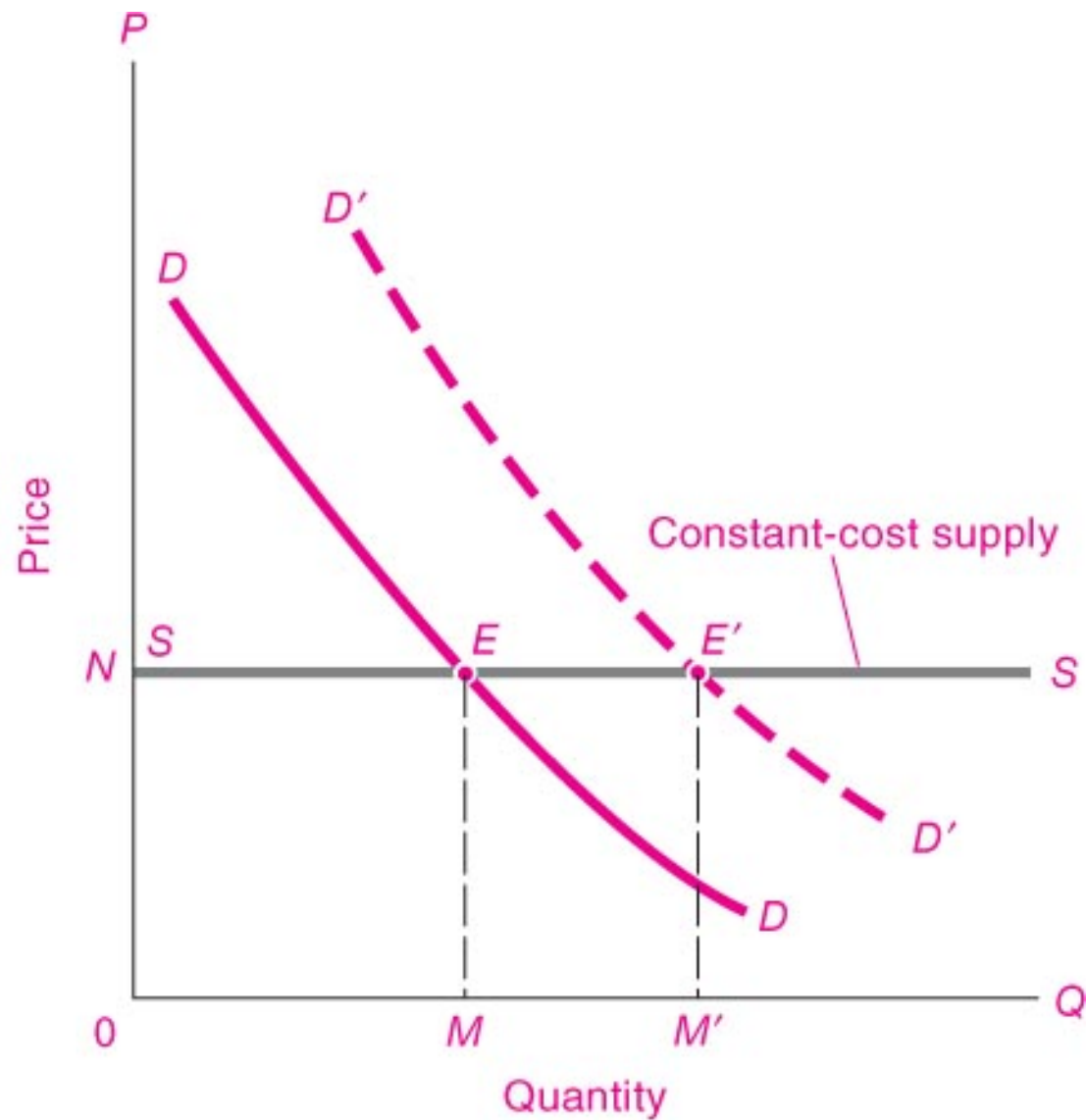


FIGURE 8-7. Constant-Cost Case

Increasing cost industries

- Increasing cost industry
 - The price of factors of production increases as the level of output increases
 - Typically, such a phenomenon will be observed if the availability of (at least some of the, if not all) inputs being used in the production process is limited in supply
 - Example, wine industry (good vineyard lands are limited in supply)
 - Limited availability of inputs implies that all inputs cannot be increased continuously. Beyond a point, the diminishing returns set in
 - Due to diminishing returns, the marginal cost rises with the level of production
- Higher demand will increase the price of good even with identical firms and free entry and exit

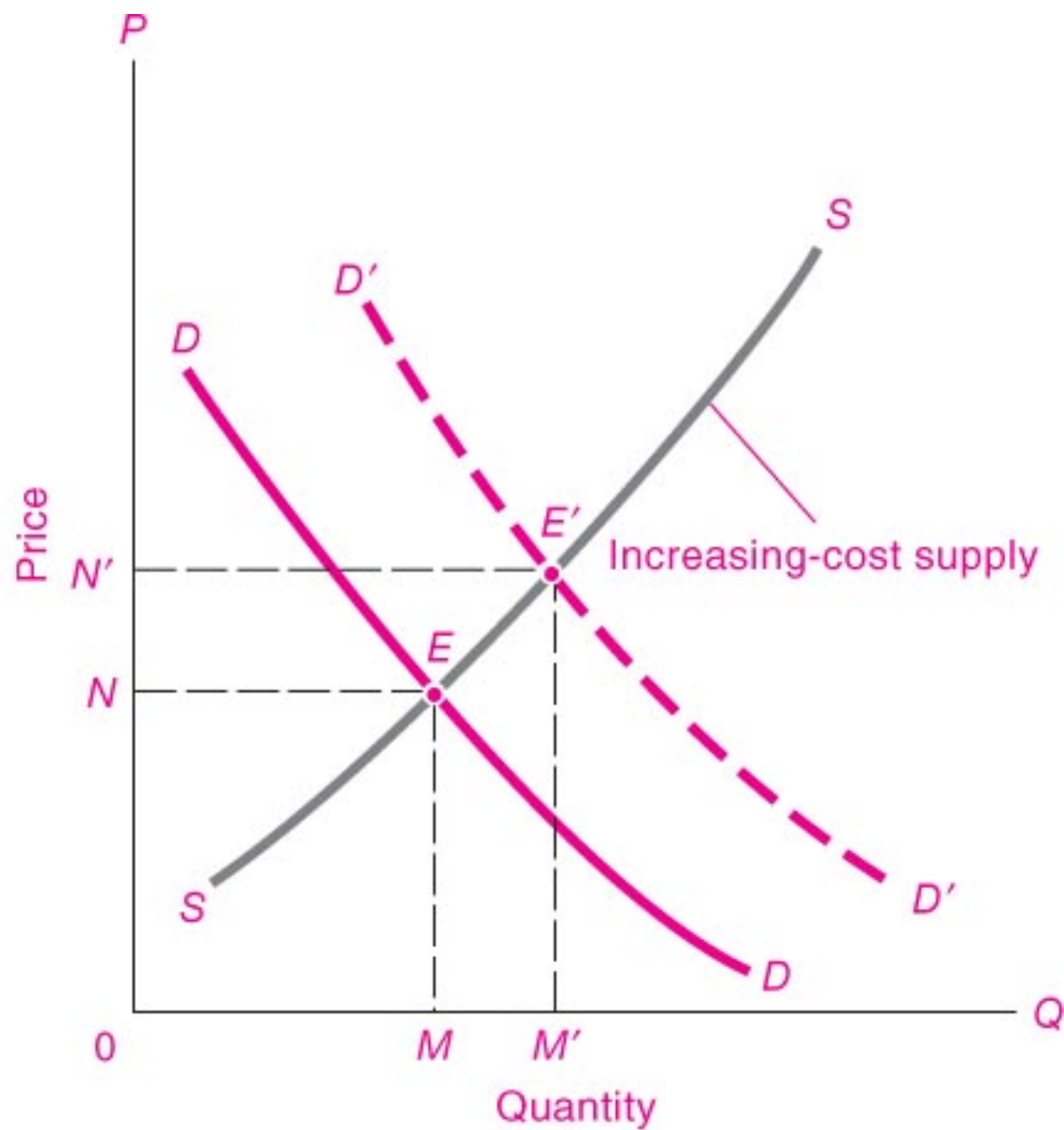
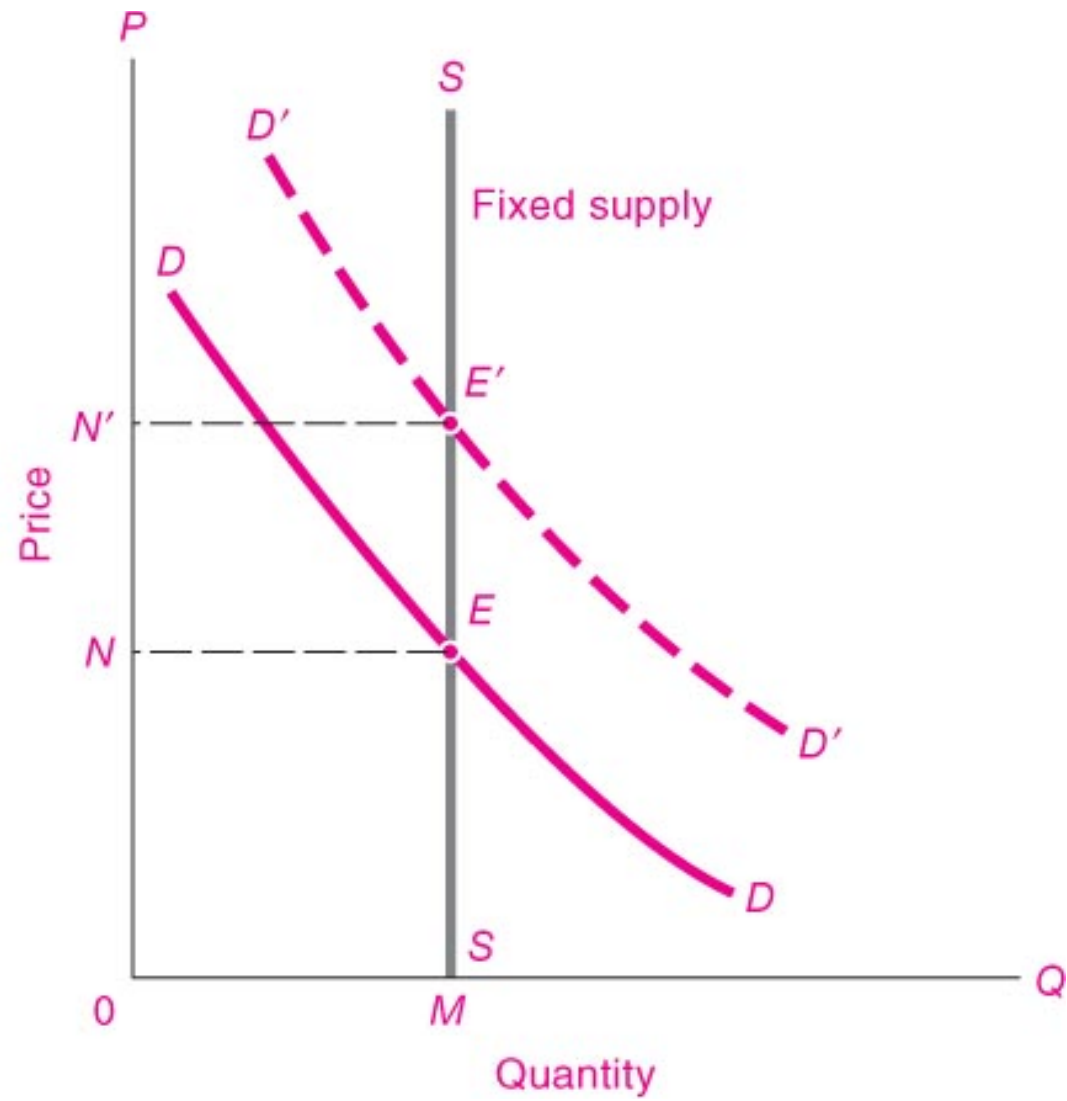


FIGURE 8-8. Increasing-Cost Case

Fixed supply

- Some goods or inputs to the production are fixed in supply
 - Examples: kohinoor; raising the pay of top managers is unlikely to change their effort
- Supply curve will be vertical
- Raising the price may not affect the quantity supplied
- And, an increase in demand of the fixed factor will only affect the price



Short and long run

Impact of a change in conditions in the short run on the long run equilibrium

- Supply response in the short and long run