Economics 2 Professor Christina Romer
Spring 2018 Professor David Romer

LECTURE 7
COMPETITIVE FIRMS IN THE LONG RUN
FEBRUARY 6, 2018

I. A LITTLE MORE ON SHORT-RUN PROFIT-MAXIMIZATION
   A. The condition for short-run profit-maximization
   B. The industry marginal cost curve
   C. The two-way interaction between individual firms and the market

II. AVERAGE TOTAL COST AND SHORT-RUN PROFITS
   A. Average total cost (atc)
   B. Graphing atc
   C. atc, price, and profits
   D. Three possible profit scenarios

III. LONG-RUN PROFIT MAXIMIZATION
   A. Short-run profits as a signal for entry or exit
   B. The impact of entry or exit on the industry supply curve
   C. Long-run equilibrium
   D. Example: A fall in demand
      1. The immediate effect of the fall in demand
      2. Profits and entry/exit
      3. The new long-run equilibrium
   E. Example: A decrease in cost
      1. The immediate effect of the fall in demand
      2. Profits and entry/exit
      3. The new long-run equilibrium

IV. SOME IMPLICATIONS OF LONG-RUN PROFIT-MAXIMIZATION
   A. The long-run industry supply curve
   B. Who enters or exits?
   C. A little on the case of heterogeneous long-run opportunity costs
   D. The invisible hand

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Announcements

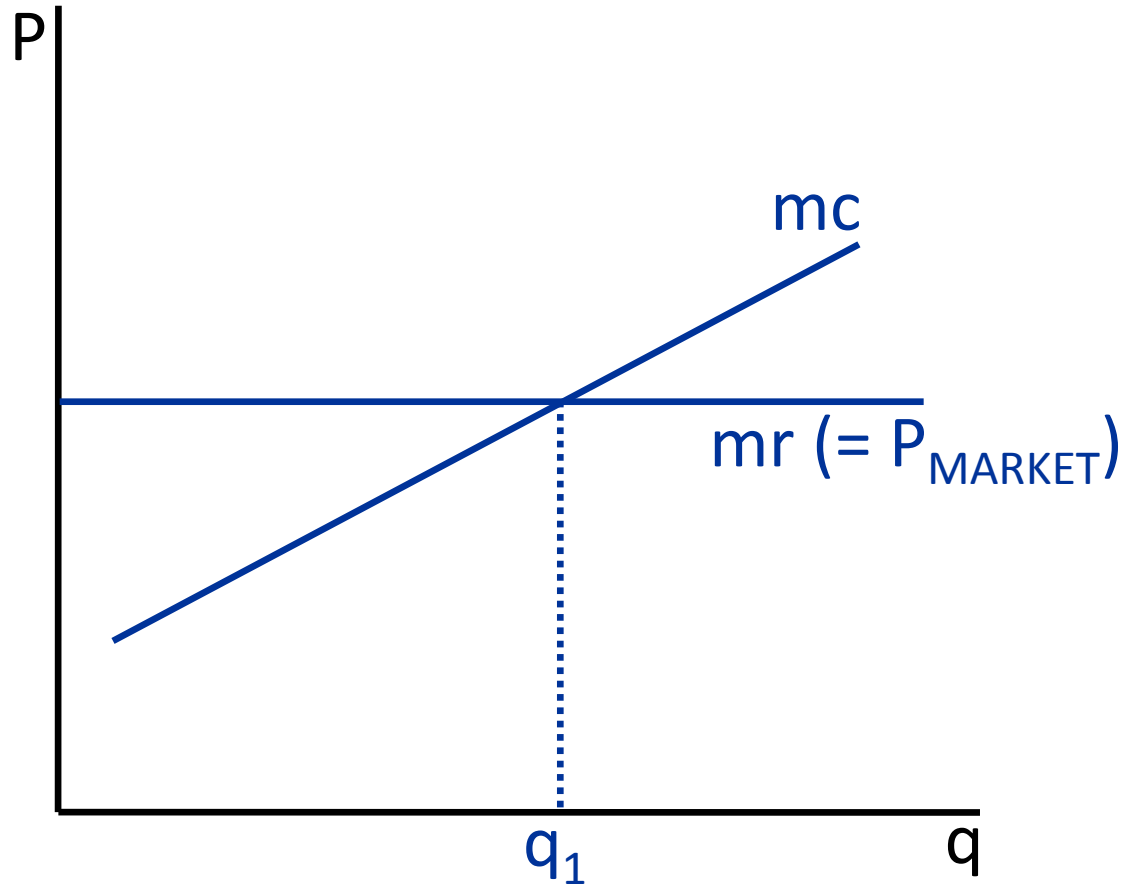
- Problem Set 2 is being handed out.
  - It is due at the beginning of lecture next Tuesday (Feb. 13).
  - The ground rules are the same as on Problem Set 1.
  - Optional problem set work session: Thursday, 4:00–6:00, in 648 Evans.
- Problem Set 1 is being returned in section this week.

Announcements

- Journal article reading for Thursday (by Edward Glaeser and Erzo Luttmer):
  - Read only the assigned pages.
  - Don’t stress over every word or parts you don’t understand.
  - Read for approach and findings; think about relevance for the consequences of not letting prices adjust.

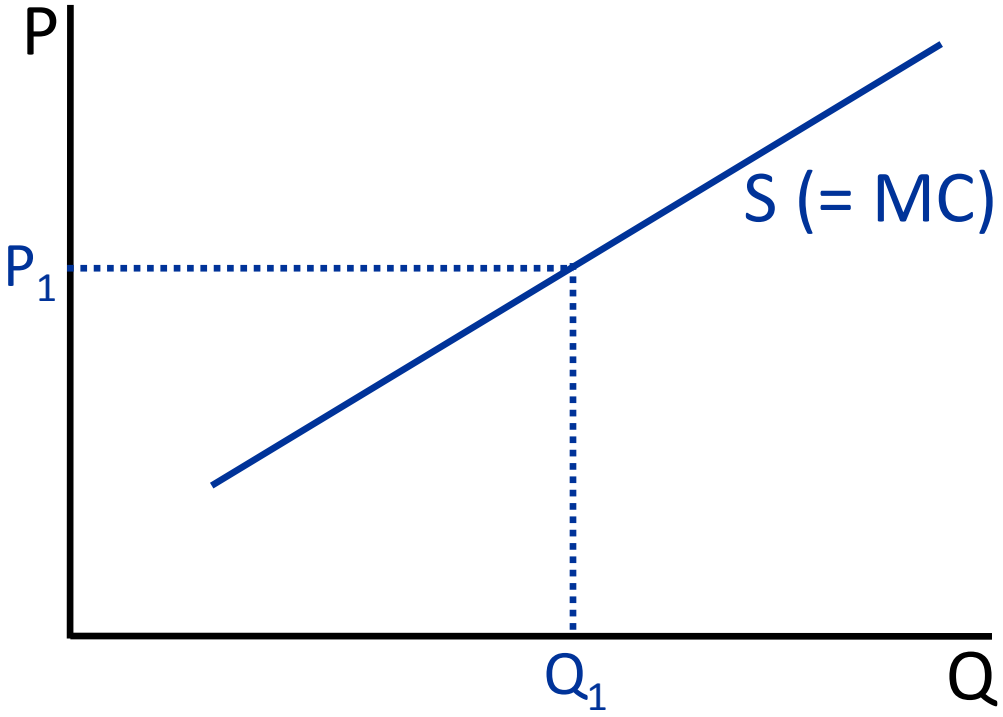
I. A Little More on Short-Run Profit-Maximization

The Profit-Maximizing Level of Output for a Perfectly Competitive Firm



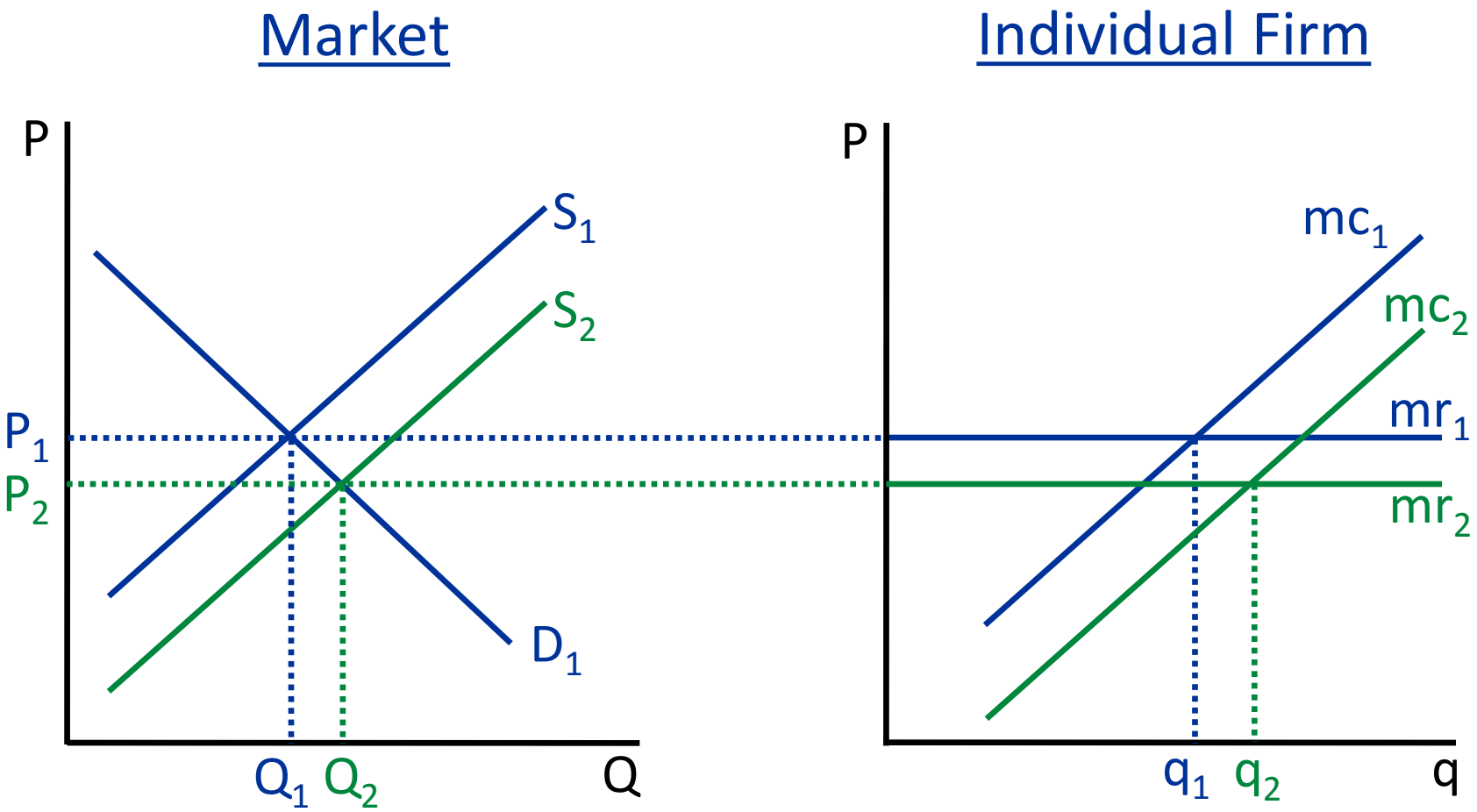
A competitive firm produces up to the point where P = mc.

The Industry Supply Curve Is the Industry Marginal Cost Curve



- At a given P, such as P_1, each firm produces until where $mc_i = P$.
- The total amount produced is the point on the supply curve (Q_1).
- So: When the industry is producing Q_1, each firm's m.c. is P_1.
- So: P_1 is the marginal cost of producing 1 more unit when the industry is producing Q_1.

The Two-Way Interaction of Individual Firms and the Market – Example: A Fall in an Input Price

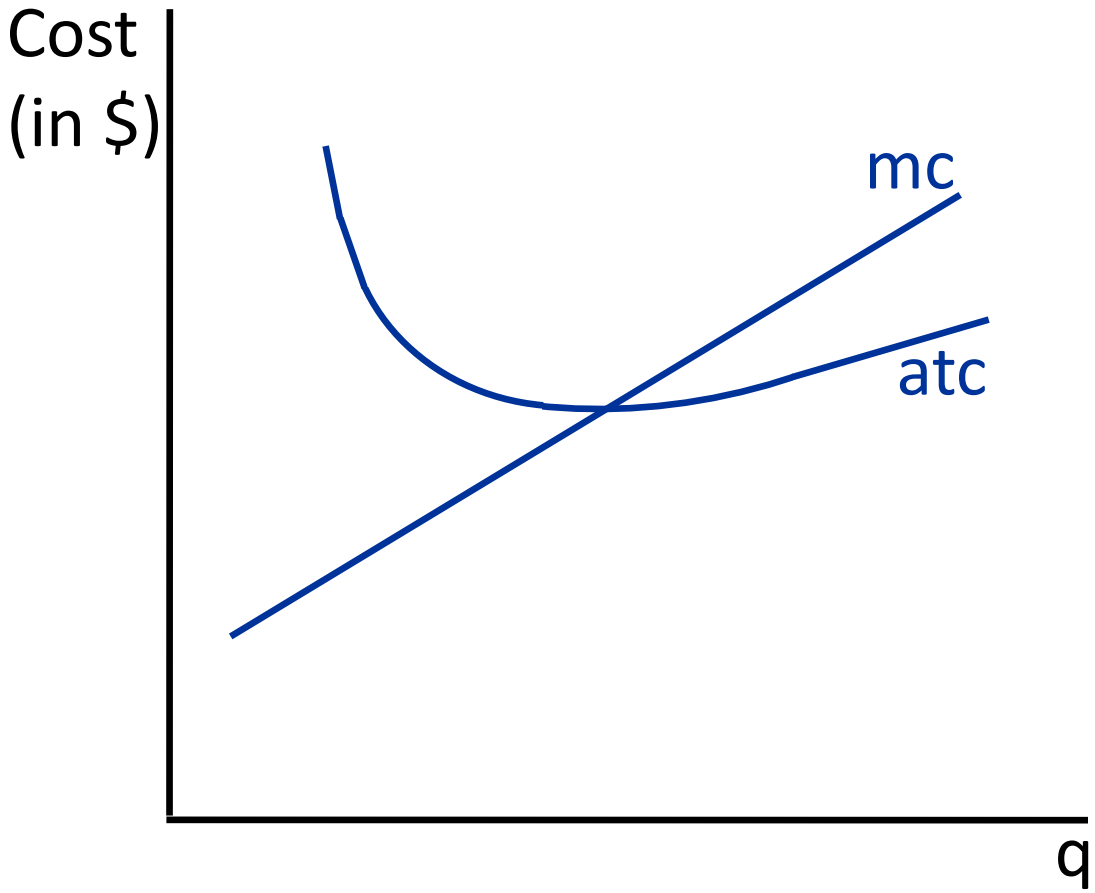


II. Average Total Cost and Short-Run Profits

Average Total Cost

- Recall:
  - Costs are measured as opportunity costs.
  - Fixed costs: Costs that do not vary with how much is produced.
  - Variable costs: Costs that do vary with how much is produced.
  - Total cost: The sum of fixed and variable costs.
- Average Total Cost = $\frac{\text{Total Cost}}{\text{Quantity}}$

Marginal Cost and Average Total Cost



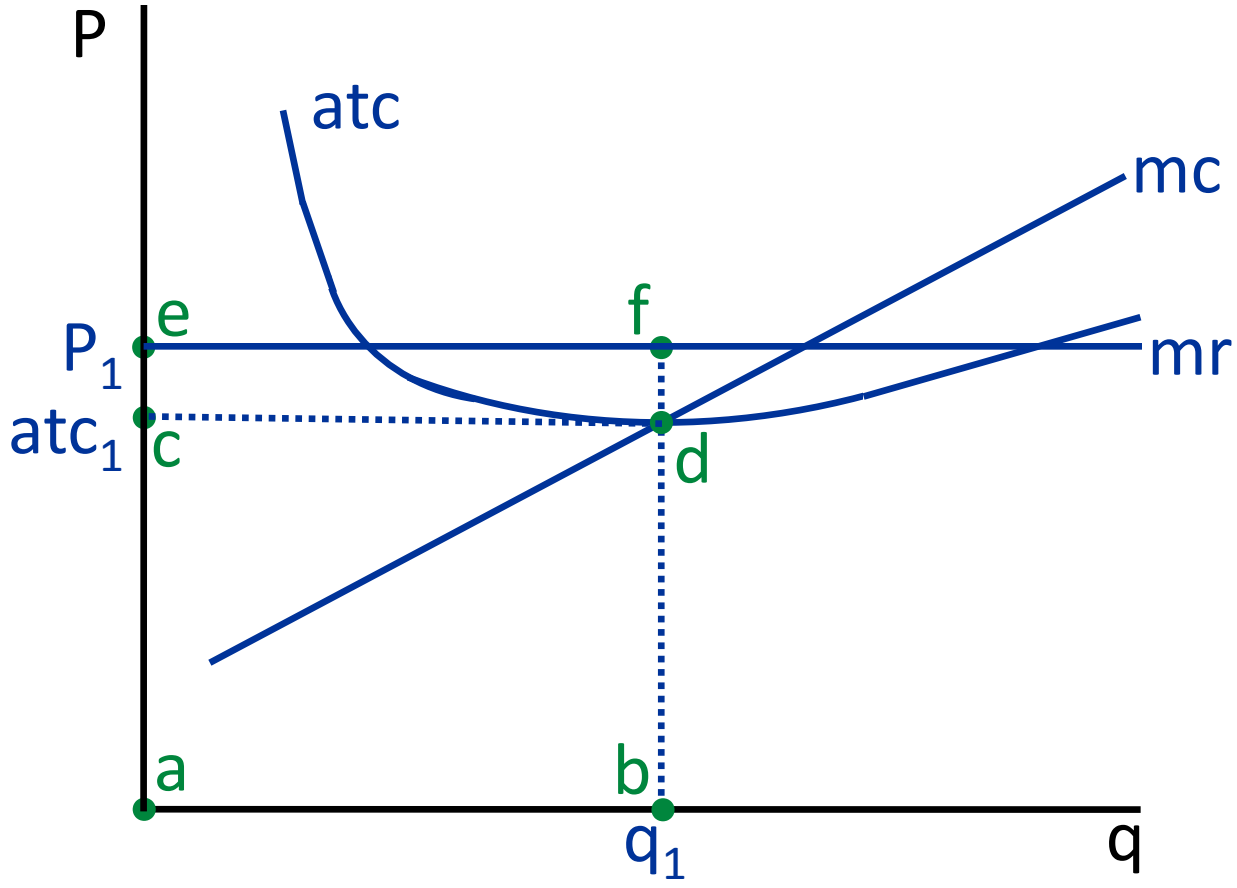
The mc and atc curves cross at the lowest point of the atc curve.

atc, Price, and Profits

- Recall:
  - Profits = Total Revenue – Total Cost
- Now:
  - Total Revenue = $P \cdot q$
  - Total Cost = $atc \cdot q$
- So: Profits = $(P \cdot q) - (atc \cdot q)$

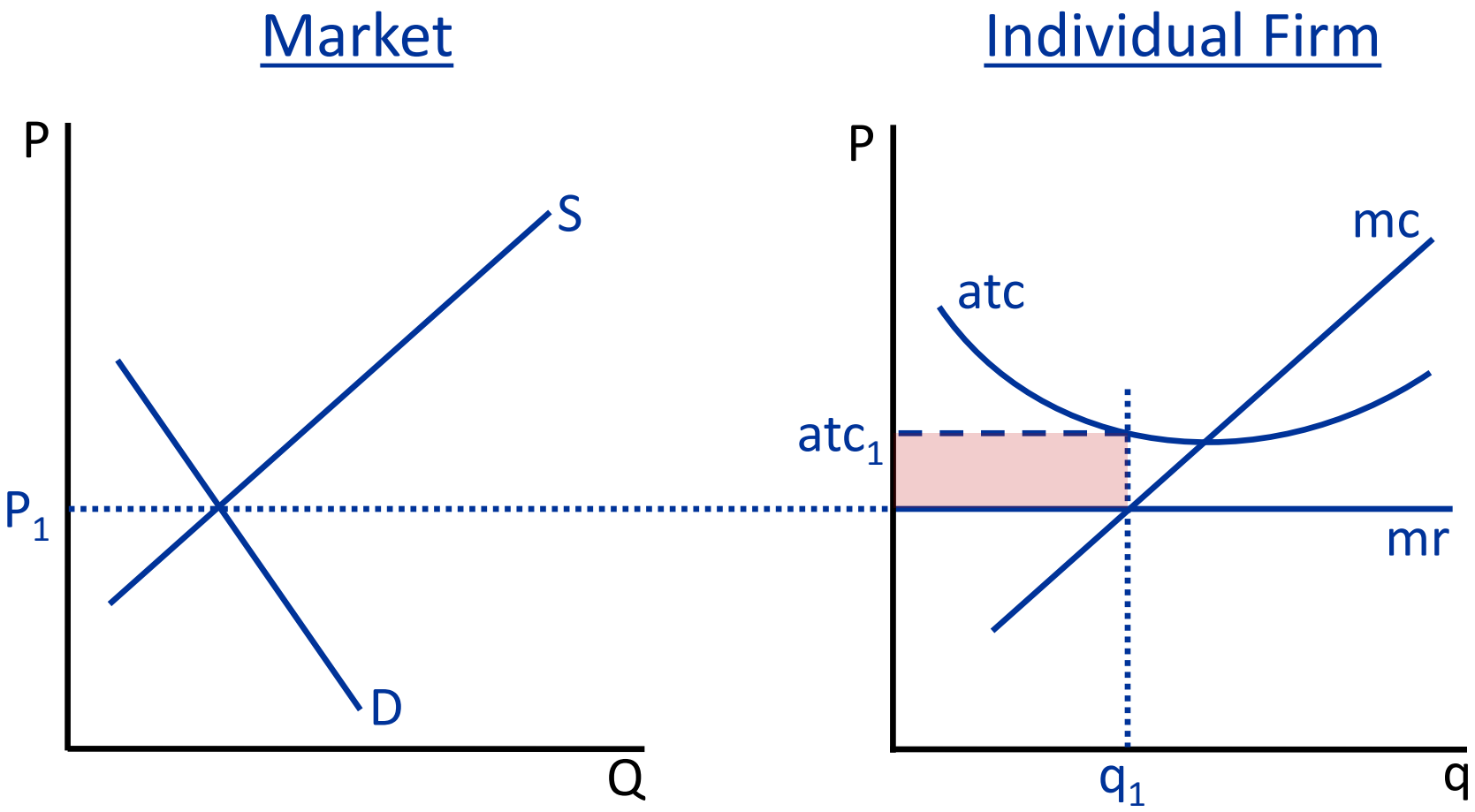
  $= (P - atc) \cdot q$
- So: Profits are positive, negative, or zero depending on whether P – atc is positive, negative, or zero.

Revenues, Costs, and Profits



Revenues: Rectangle abef. Costs: abcd. Profits: cdef.

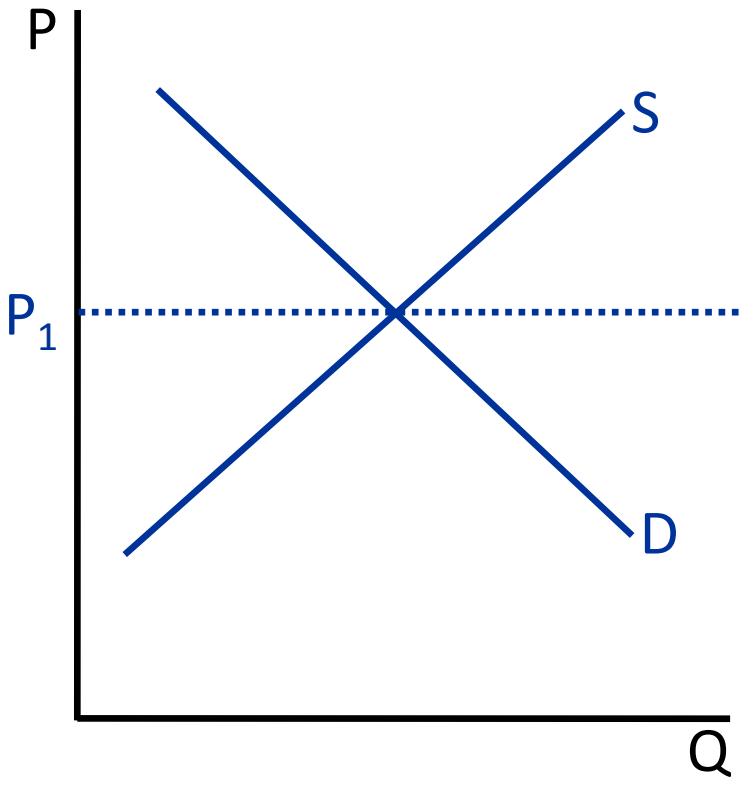
Negative Economic Profits



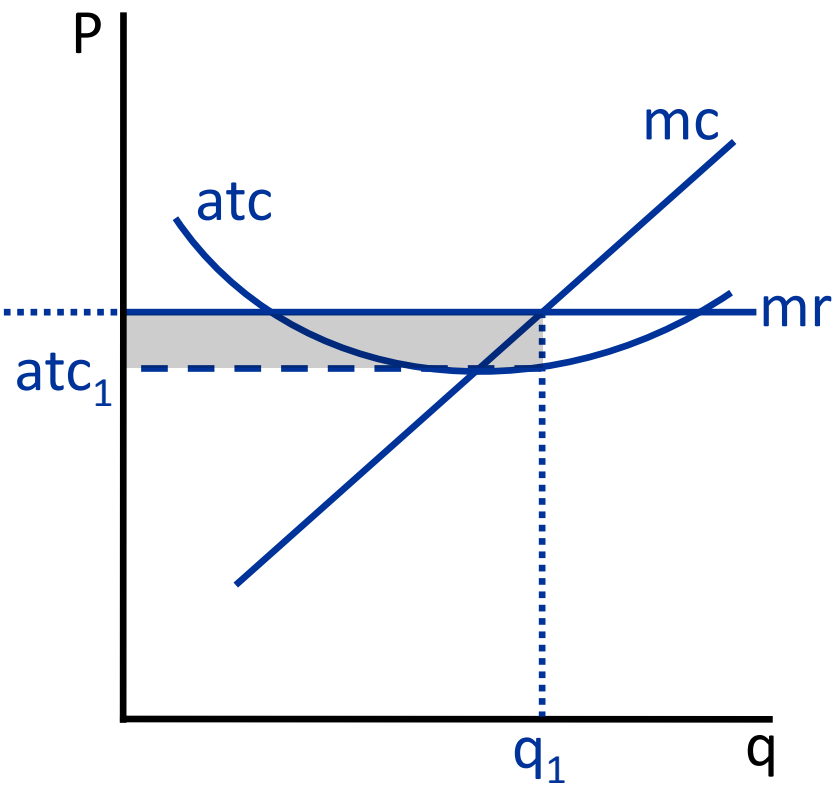
P_1 < atc at q_1.

Positive Economic Profits

Market

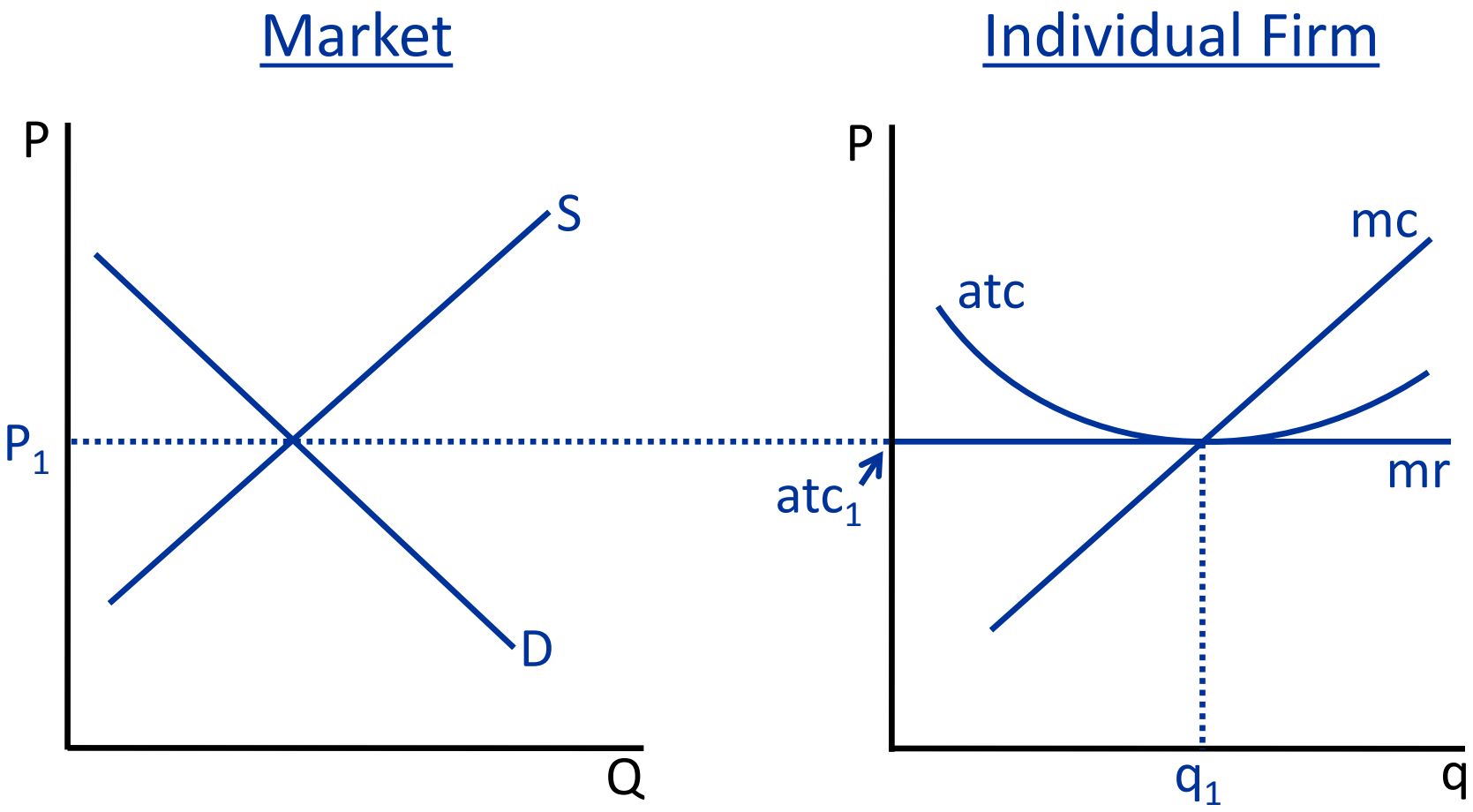


Individual Firm



P_1 > atc at q_1.

Zero Economic Profits



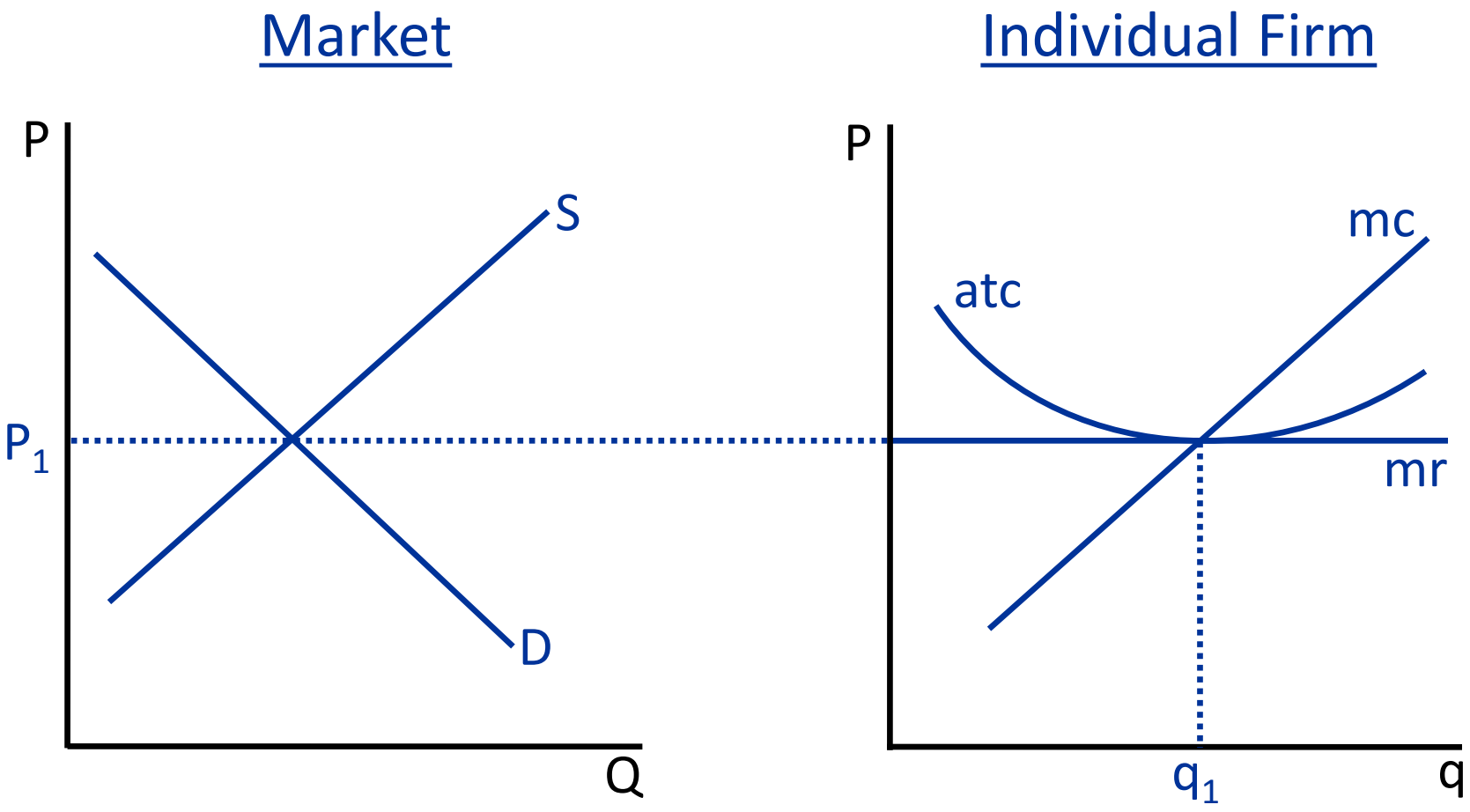
P_1 = atc at q_1.

III. Long-Run Profit-maximization

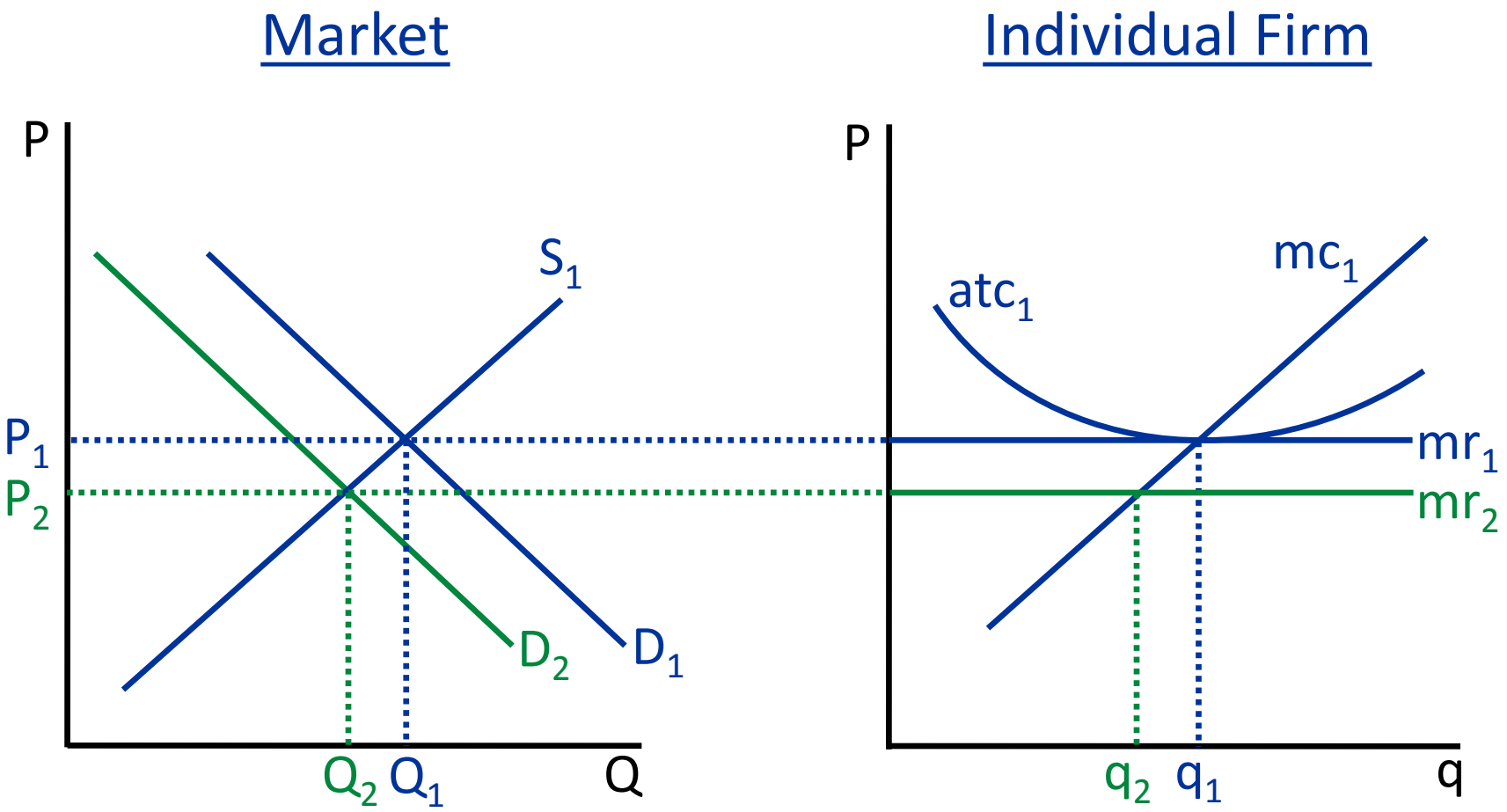
The Signals Sent by Profits

- If there are negative profits: Some firms will reduce the scale of their operations, or exit.
- If there are positive profits: Some firms will expand the scale of their operations, or new firms will enter.
    - Exit moves the industry supply curve to the left; entry moves it to the right.
- If there are zero profits: There are no forces tending to cause either contraction or expansion of the industry. In this situation, the industry is in long-run equilibrium.

Long-Run Equilibrium



Fall in Demand (Starting in Long-Run Equilibrium) – Short-Run Effects



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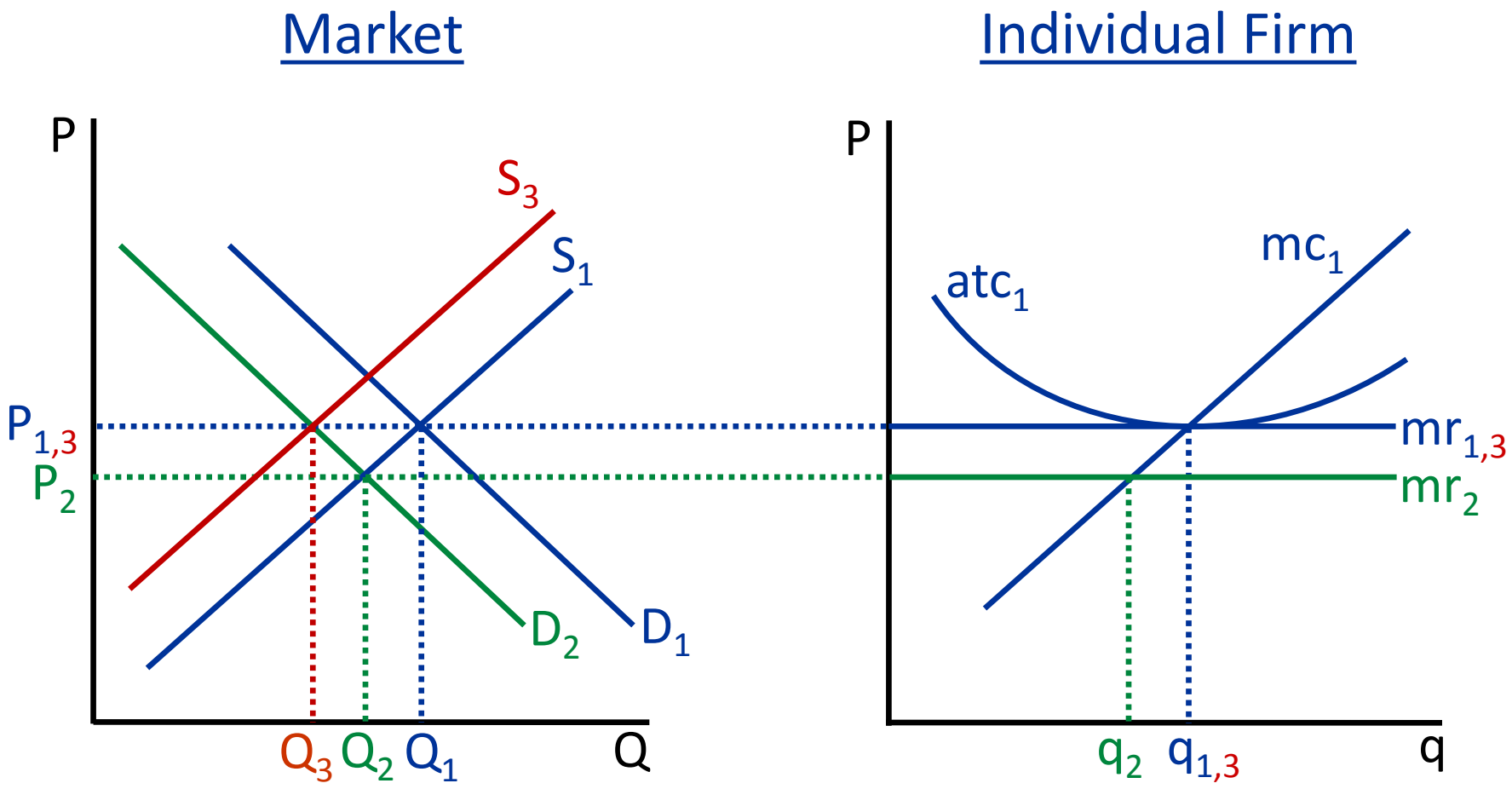
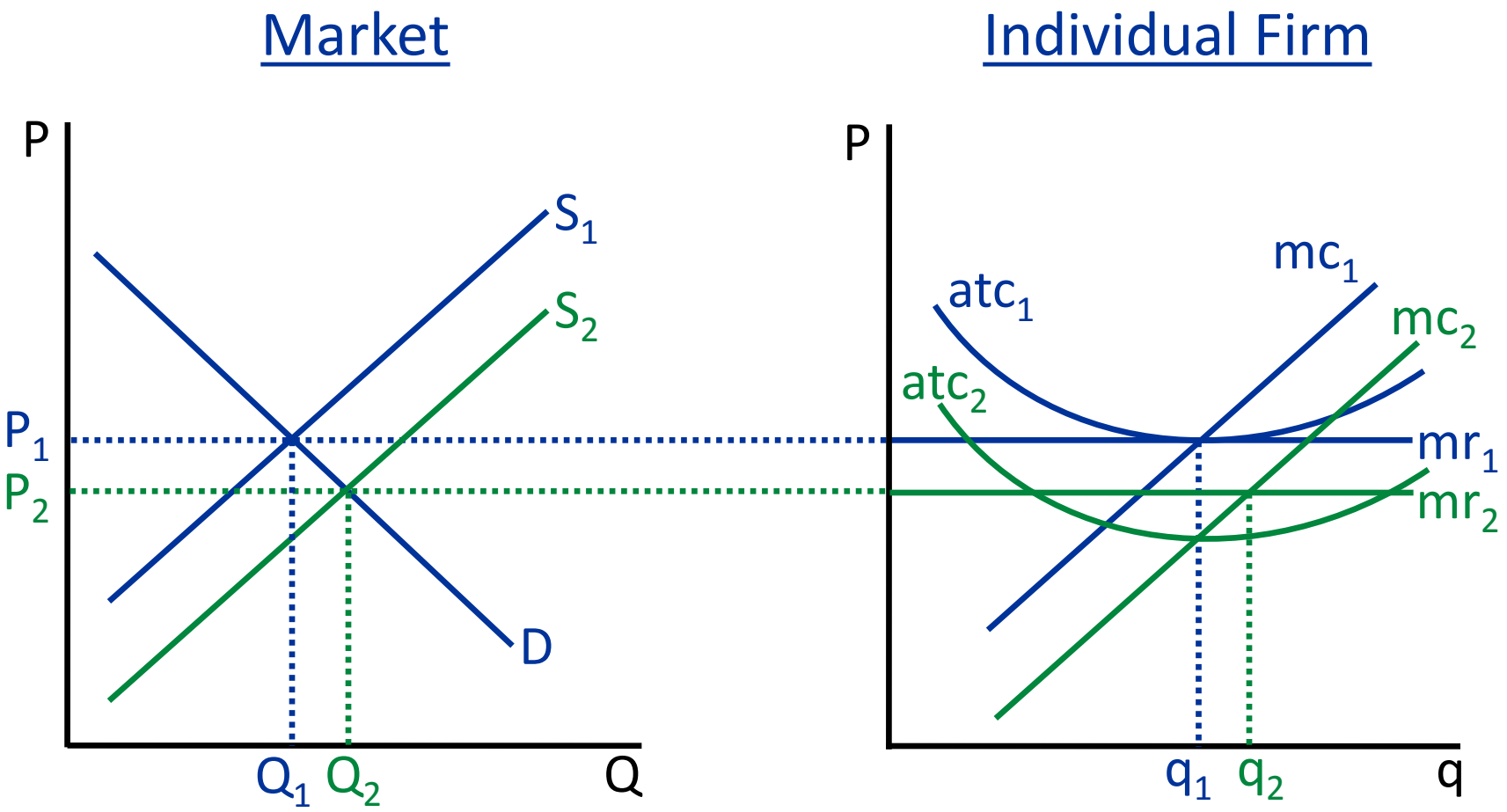
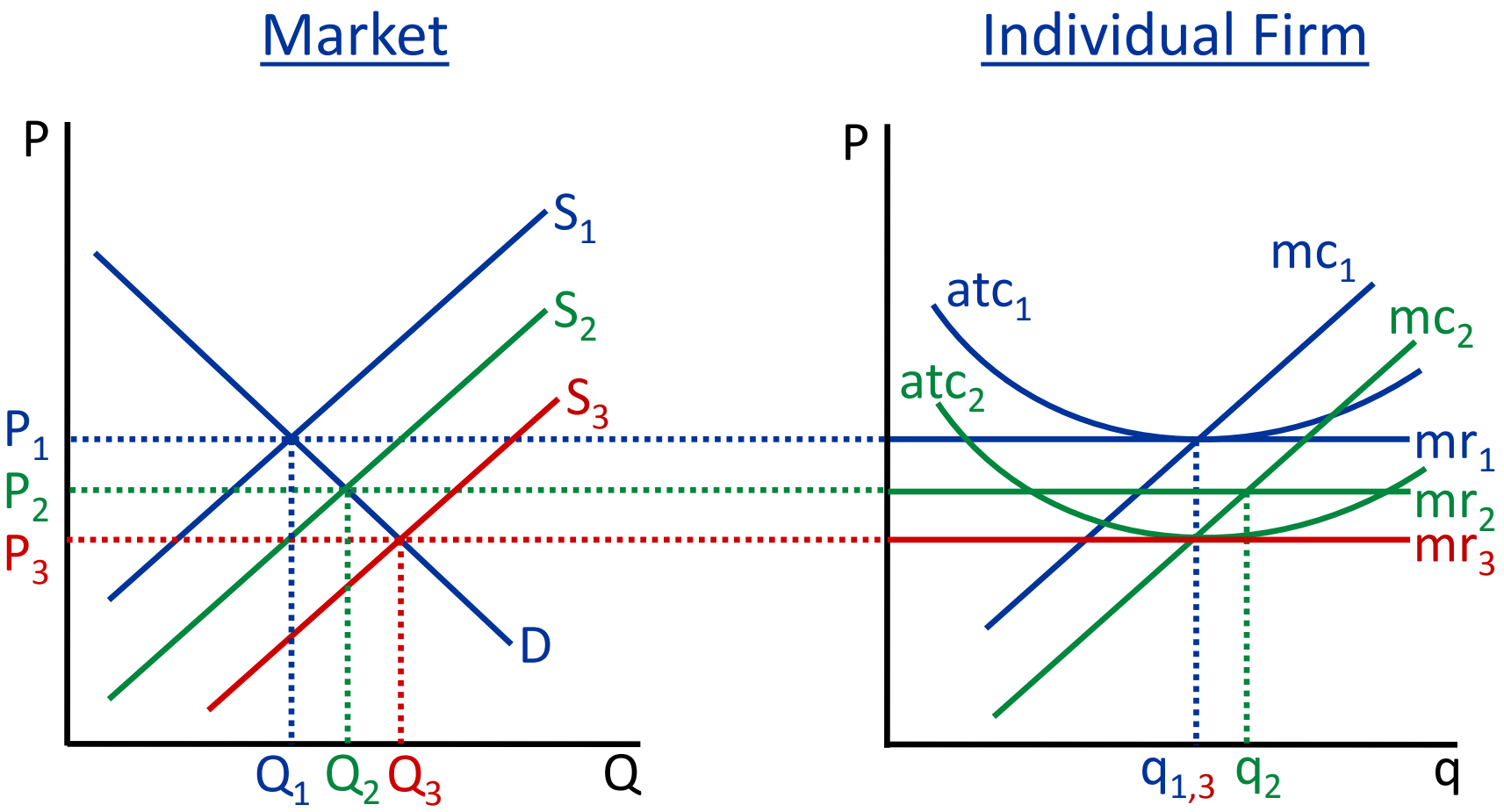


Fall in Marginal Cost (Starting in Long-Run Equilibrium) – Short-Run Effects

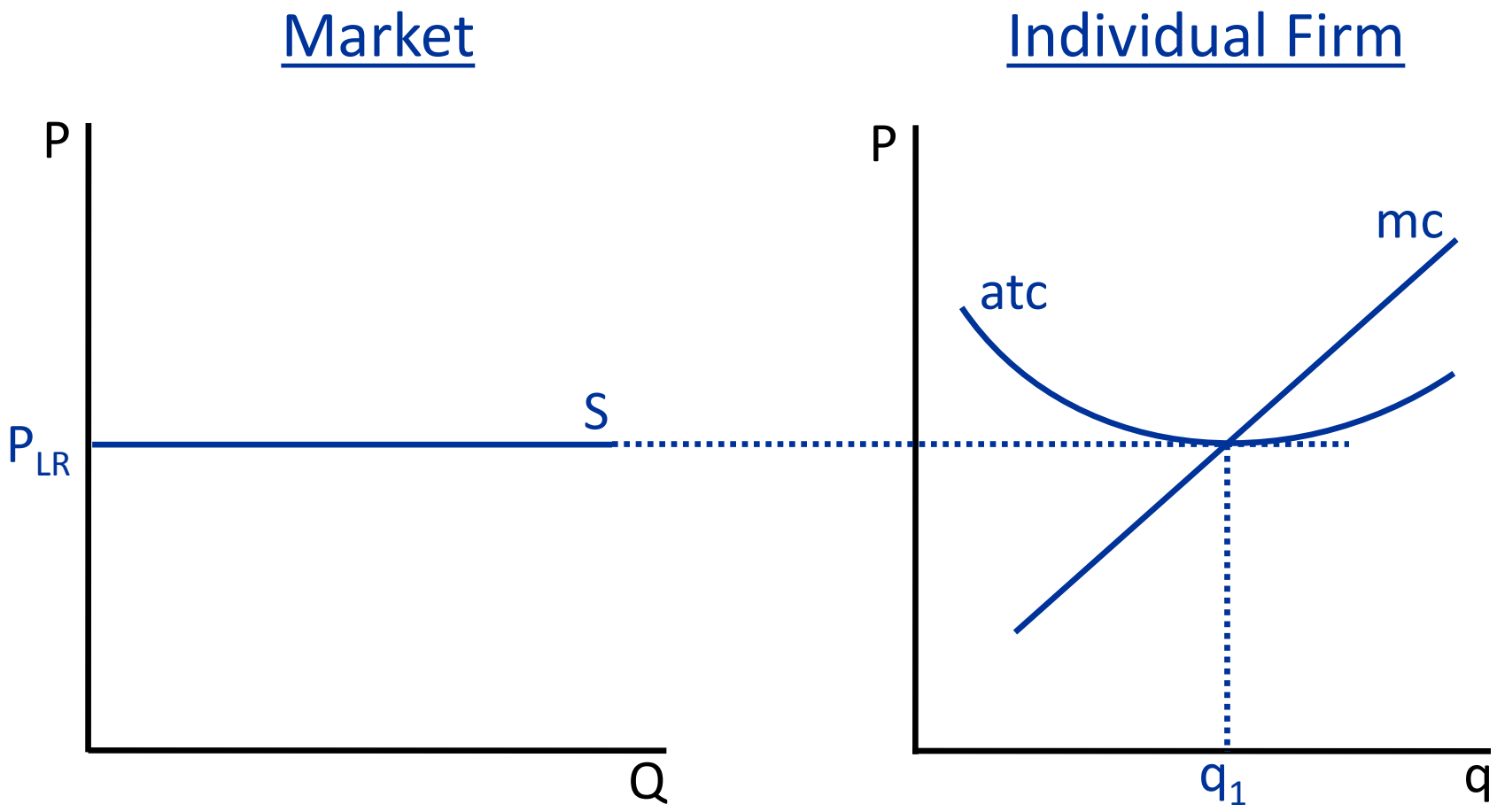


Fall in Marginal Cost (Starting in Long-Run Equilibrium) – Long-Run Effects



IV. Some Implications of Long-Run Profit Maximization

The Long-Run Industry Supply Curve



The long-run industry supply curve is perfectly elastic at the minimum of atc.

Other Implications of Long-Run Profit Maximization

- Who enters or exits?
- A little about what happens if there is variation in long-run opportunity cost.
- The invisible hand.