LECTURE 8
COMPETITIVE FIRMS IN THE LONG RUN
FEBRUARY 11, 2016

I. A LITTLE MORE ON SHORT-RUN PROFIT-MAXIMIZATION
   A. The industry marginal cost curve
   B. 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
   E. Example: A decrease in costs

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
LECTURE 8
Competitive Firms in the Long Run

February 11, 2016
Announcements

- **Problem Set 2** is due at the *beginning* of lecture next Tuesday (Feb. 16).

- **Problem Set Work Session** this Friday (Feb. 12), 4:00–6:00, in 639 and 648 Evans.

- **Ground Rules:** Answers must be in your own words, handwritten, and with acknowledgments to the people you worked with.

- There will be **2 collection points** on Tuesday – by the tables near the doors in the middle of the lecture hall.
Announcements (continued)

• Research reading for Thursday (by Glaeser and 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 – Example

• Suppose there are 100 firms. Each has MC at 1000 units of $5, MC at 2000 units of $6, etc.

• Then the MC of the industry at 100,000 units is $5, at 200,000 units is $6, etc.
The Two-Way Interaction of Individual Firms and the Market – The Case of the 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 = \( \frac{\text{Total Cost}}{\text{Quantity}} \)
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

Negative Economic Profits

Market

Individual Firm

$P_1 < \text{ATC at } q_1$. 
Positive Economic Profits

Market

Individual Firm

\[ P_1 > ATC \text{ at } q_1. \]
P_1 = ATC at q_1.
III. Long-Run Profit-Maximization
The Signals Sent by Short-Run 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.

• If there are zero profits: There are no forces tending to cause either contraction or expansion of the industry.

• Exit moves the industry supply curve to the left; entry moves it to the right.
Long-Run Equilibrium

Market

Individual Firm

\[ P \]
\[ P_1 \]
\[ Q \]

\[ D \]
\[ S \]

\[ q \]
\[ q_1 \]

\[ MR \]
\[ MC \]

\[ ATC \]
Fall in Demand (Starting in Long-Run Equilibrium) – Short-Run Effects

*Market*

*Individual Firm*
Fall in Demand (Starting in Long-Run Equilibrium) – Long-Run Effects

Market

Individual Firm

\[ D_1, S_1 \]

\[ D_2, S_3 \]

\[ P_1,3, P_2 \]

\[ Q_1, Q_2, Q_3 \]

\[ q_2, q_{1,3} \]
Fall in Marginal Cost (Starting in Long-Run Equilibrium) – Short-Run Effects

**Market**

- Demand curve: \( D \)
- Supply curve 1: \( S_1 \)
- Supply curve 2: \( S_2 \)
- Price: \( P_1 \) to \( P_2 \)
- Quantity: \( Q_1 \) to \( Q_2 \)

**Individual Firm**

- Marginal Revenue curve: \( MR_1 \) to \( MR_2 \)
- Marginal Cost curve: \( MC_1 \) to \( MC_2 \)
- Average Total Cost curve 1: \( ATC_1 \)
- Average Total Cost curve 2: \( ATC_2 \)
- Quantity: \( q_1 \) to \( q_2 \)
Fall in Marginal Cost (Starting in Long-Run Equilibrium) – Long-Run Effects

**Market**

**Individual Firm**

\[ \text{Market} \]

\[ \text{Individual Firm} \]
IV. SOME IMPLICATIONS OF LONG-RUN PROFIT MAXIMIZATION
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.