

Supply

ECON 370: Microeconomic Theory

Summer 2004 – Rice University

Stanley Gilbert

Production by a Competitive Firm

- Remember:
 - A competitive firm takes all prices as given
 - A production function $F(x_1, \dots, x_n) \dots$
 - And Input Prices, $(p_1, \dots, p_n) \dots$
- Can summarized in
 - Long-run cost function $c_L(y)$
 - Long-run cost function $c_s(y)$
- Then the firm produces at the point where
 - $p_y = c'(y) = MC(y)$

Econ 370 - Supply

2

Mathematically

- In particular, a firm seeks to maximize profit:

- $\Pi = p_y y - c_s(y)$

- First-Order Condition is:

$$\frac{\partial \Pi}{\partial y} = \frac{\partial}{\partial y} p_y y - \frac{\partial}{\partial y} c_s(y) = p_y - c'_s(y) = 0 \quad \Rightarrow p_y = MC_s(y)$$

- Second-Order Condition is:

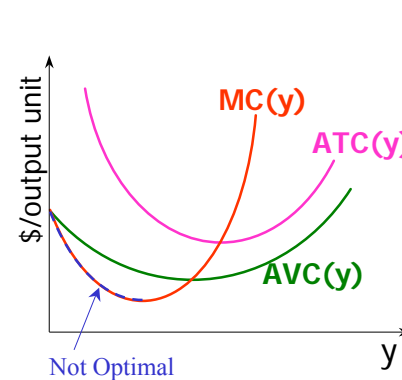
$$\frac{\partial^2 \Pi}{\partial y^2} \leq 0 \quad \Rightarrow \frac{\partial}{\partial y} [p_y - c'_s(y)] = -\frac{\partial}{\partial y} MC_s(y) \leq 0$$

or $\frac{\partial}{\partial y} MC_s(y) \geq 0$

Econ 370 - Supply

3

Supply Decision



- Second-Order Condition:

$$\frac{\partial}{\partial y} MC(y) \geq 0$$

- Implies:
- Downward-sloping part of marginal cost curve is not part of supply curve

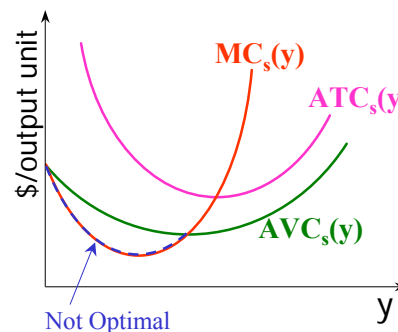
Econ 370 - Supply

4

An Exception

- In some cases, the profit-maximizing production level is zero
- That is, the firm is better off shutting down
- In those cases, $p \neq MC_s$
- Short Run
 - This applies when $p_y < AVC(y)$
- Long Run
 - This applies when $p_y < ATC(y)$

Short Run Shut-Down

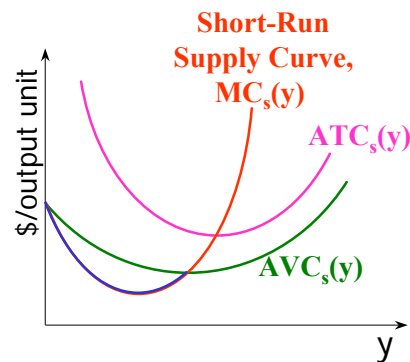


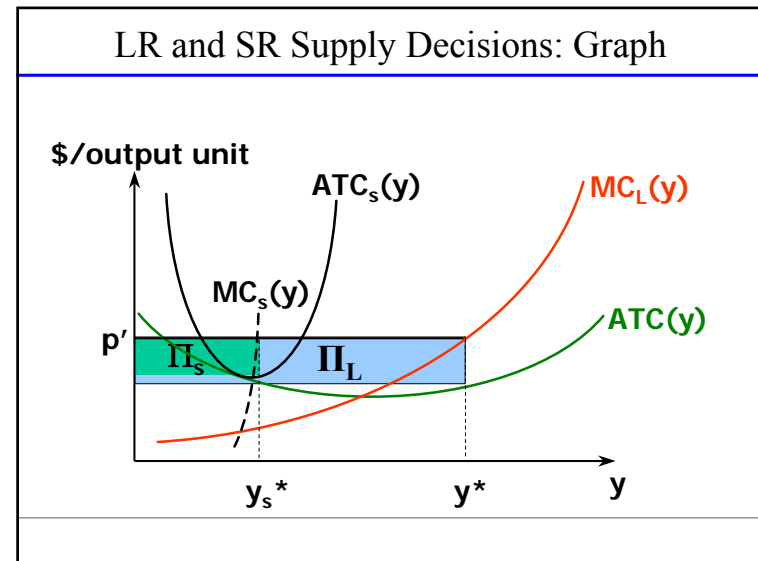
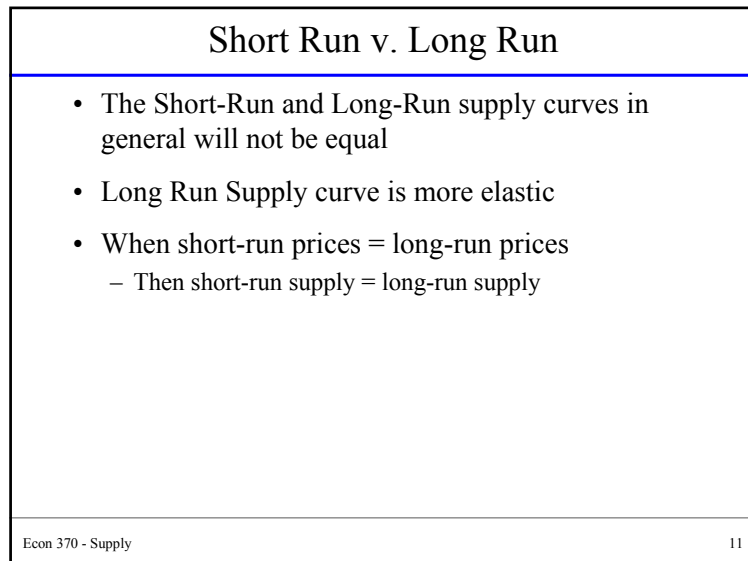
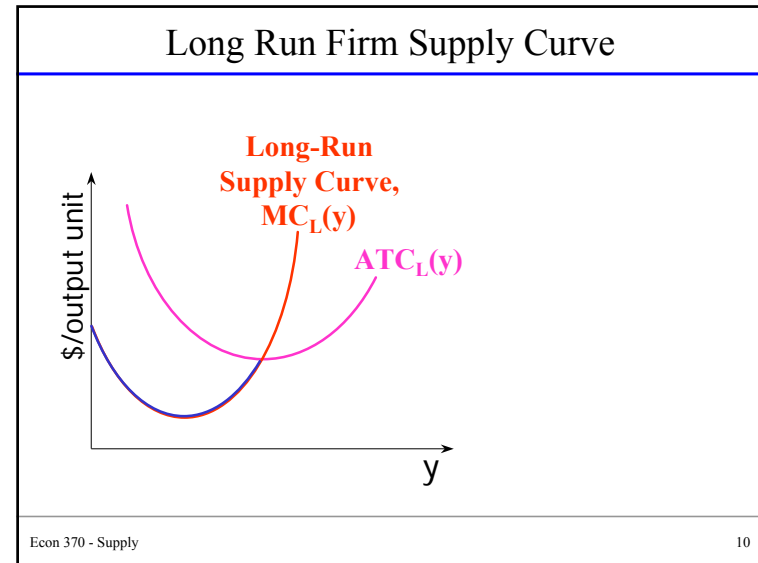
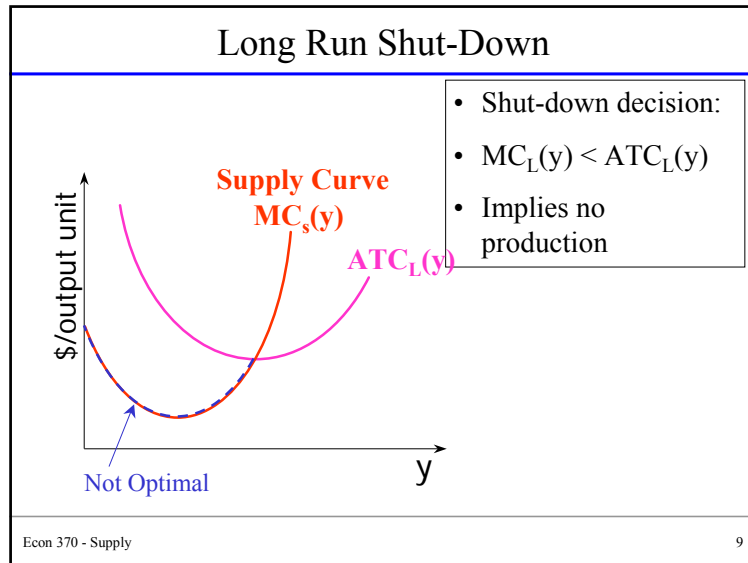
- Shut-down decision:
- $MC_s(y) < AVC_s(y)$
- Implies no production

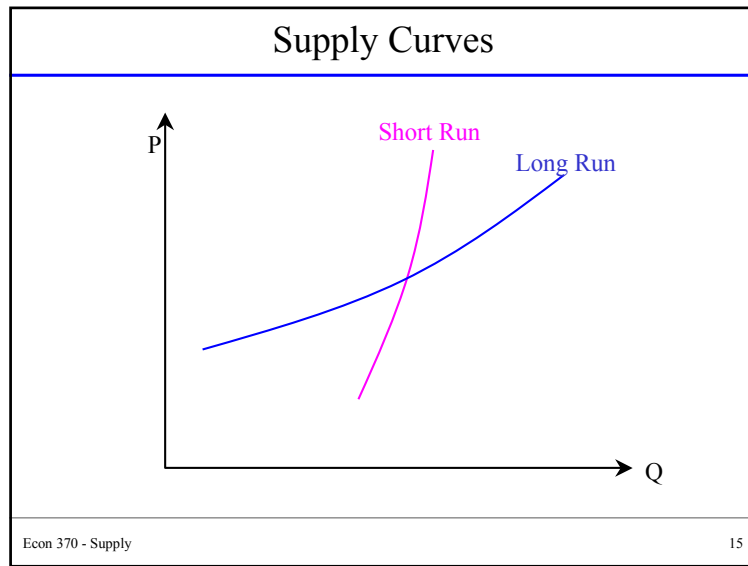
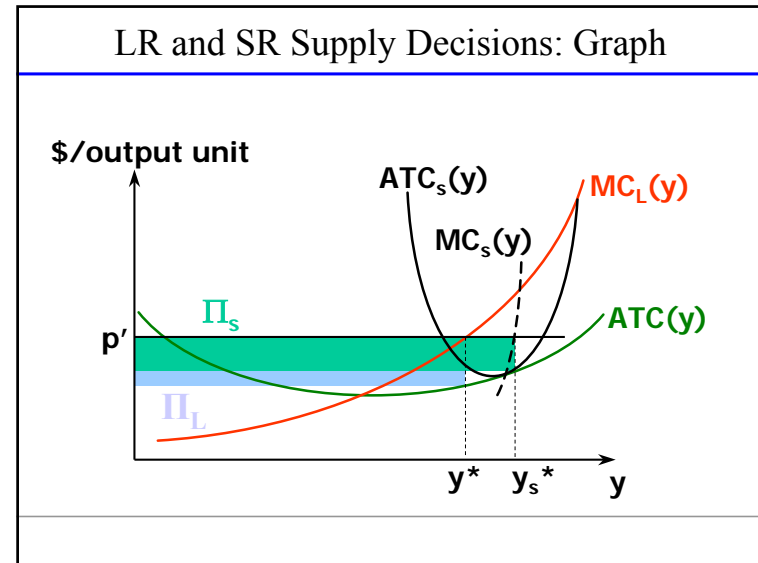
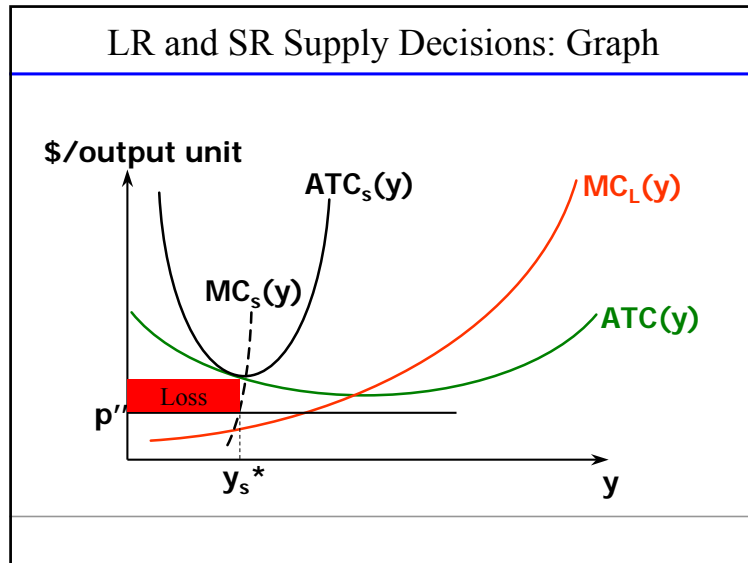
Short Run Firm Supply Curve

- The Supply curve is a function representing how much a firm will supply for any given price
- That is, it is a function $q = S_s(p)$
- And, it is equal to the marginal cost curve above the shutdown level

Short Run Firm Supply Curve







- ### Market Supply – No Entry
- We assume that in the short run, there is no entry into the market
 - When there is no entry into the market,
 - The market supply curve is the sum of the supply curves for individual firms
 - That is
 - If $S_i(p)$ is the supply curve for firm i
 - The **market** supply curve $S_M(p)$ is:
 - $S_M(p) = \sum S_i(p)$

Long Run Market Supply

- In the long run, market entry is possible
- If I can earn \$50,000 per year teaching economics,
- But I can earn \$100,000 per year by starting a consulting firm,
- What am I likely to do?

“Zero Profit” Condition

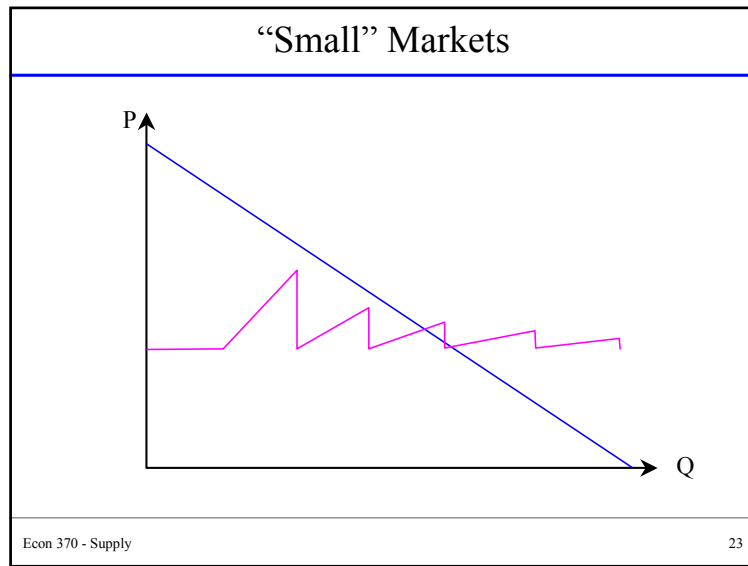
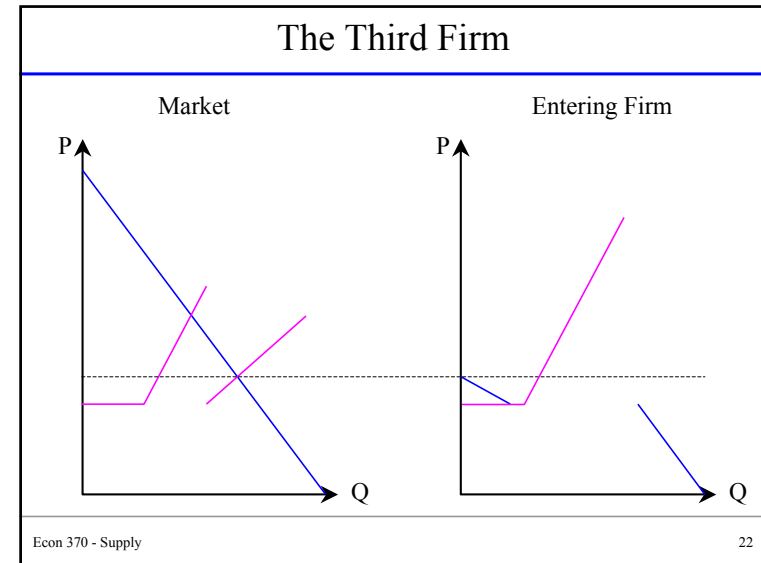
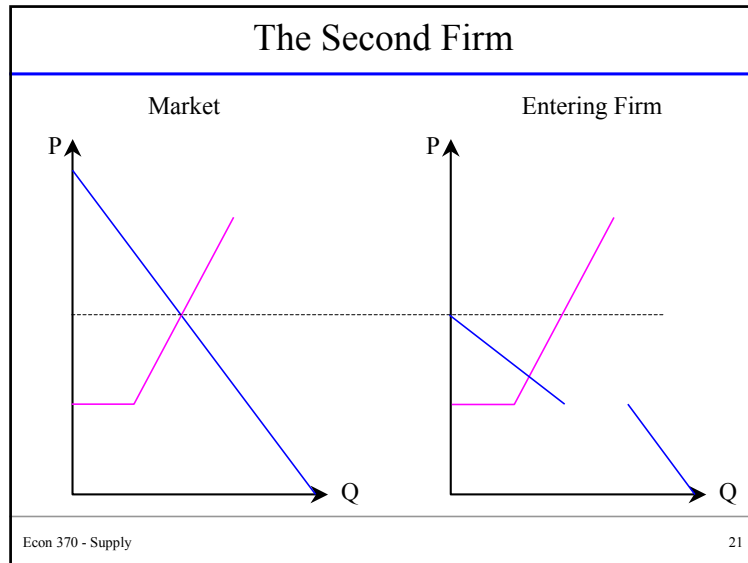
- $Economic\ Profit = Revenue - Economic\ Cost$
- So *Economic Profit* represents the *excess* return to a factor over its market return
- If capital earns twice the market rate in the computer industry,
 - Then we expect a lot of people to invest in the computer industry
 - Thus (eventually) competing away the *economic* profits
 - So in the long run, we expect *economic* profits to be zero
- Note: $Economic\ Profit \neq Accounting\ Profit$

“Zero Profit” Continued

- If capital earns half the market rate in the typewriter industry,
 - Then we expect investors to *disinvest* from the industry
 - And the industry to shrink
 - Thus (eventually) restoring zero *economic* profits
- So *Economic* profits (or losses) serve as a signal that more (or less) investment is needed in an industry

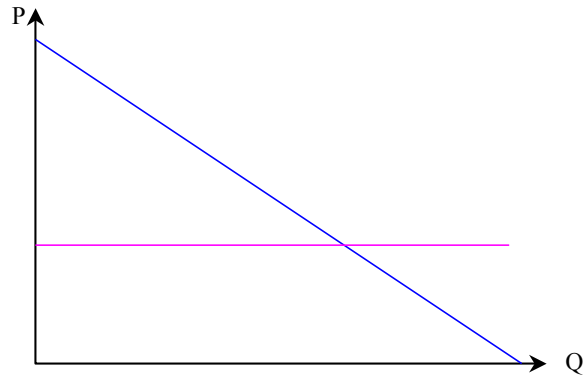
Firm Demand

- The demand an individual firm faces is...
- The Market Demand Curve...
- Minus the supply curves of all other firms in the market



- ### Long Run Market Supply
- “Small” Markets
 - Can be served by only a few firms
 - Profits for incumbent firms *may* be > 0
 - But, profits for any potential entrant will be < 0
 - Example: Large commercial jets
 - For “Large” Markets
 - No firm has more than a small piece of the market
 - Economic Profits for all firms are zero
 - Price is $p \approx \min\{ATC\}$
 - Example: the world market for wheat
- Econ 370 - Supply 24

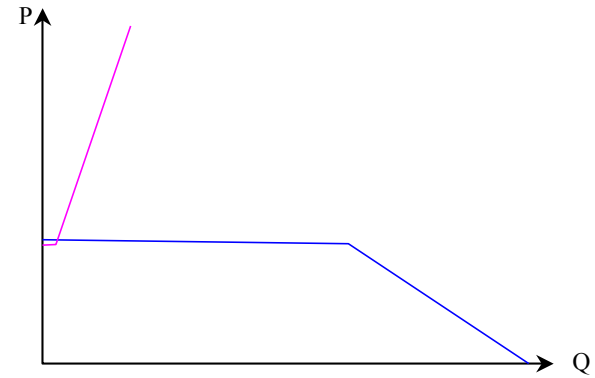
Limiting Case – “Large” Markets



Econ 370 - Supply

25

“Large” Markets: Individual Firm



Econ 370 - Supply

26