Perfect Competition--A Model of Markets
Starring

- The Perfectly Competitive Firm
- Profit Maximizing Decisions
  * In the Short Run
  * In the Long Run
Featuring

- An Overview of Market Structures
- The Assumptions of the Perfectly Competitive Model
- The Marginal Cost = Marginal Revenue Rule
- Marginal Cost and Short Run Supply
- Social Surplus
Part III: Profit Maximization in the Long Run

- First, we review profits and losses in the short run
- Second, we look at the implications of the freedom of entry and exit assumption
- Third, we look at the long run supply curve
Output Decisions

Question: How can we use what we know about production technology, costs, and competitive markets to make output decisions in the long run?
Reminders...

- Firms operate in perfectly competitive output and input markets
- In perfectly competitive industries, prices are determined in the market and firms are price takers
- The demand curve for the firm’s product is perceived to be perfectly elastic
- And, critical for the long run, there is freedom of entry and exit
- However, technology is assumed to be fixed
The firm maximizes profits, or minimizes losses by producing where $MR = MC$, or by shutting down.
Profit at $P_1$

- Profit! $(p_1 - atc_1)q_1$ =
Losses at $P^*$

- Loss! $(\text{atc}_1 - p^*)q_1 = \text{Area}$
Losses but Operate since $P > AVC$

- Operate! Your loss, $(atc_1 - p_1)q_1$ is less than loss by shutting down, $FC$
- $FC = (atc_1 - avc_1)q_1$
Shut Down since $P < AVC$

- **Shut down!** Your loss by shutting down, $FC = (\text{atc}_1 - \text{avc}_1) \cdot q_1 =$ is less than by operating at $q_1$ $(\text{atc}_1 - p_1) \cdot q_1 =$
Market Supply

- Sum of Individual Firm's Supply Curves
- Entry or exit, in response to profits or losses, shifts market supply and thus price
The Long Run

- Recall that the long run is defined as the time it takes for fixed costs to change. In other words - all costs are variable. The ATC curve equals the AVC curve.
- Also recall that Perfect Competition assumes that there is costless entry and exit. In other words people can start up firms, expand existing firms, or shut down firms.
Perfect Competition in the Long Run

- If there are profits being made in an industry, firms will enter.
- If there are losses in an industry, firms will leave.
- But what happens to the market when things like this happen?
- Consider the previous example where the typical firm was making profits in the short run.
Profit \( = (p - ATC) \times q \)
Profit Maximizing in Long Run

- Firms see this profit and enter the industry
- More firms in an industry means market supply increases
- This drives price down and profits down
- Firms continue to enter until the price is driven down so low that profits are zero. Then no more firms want to enter and there is a long run equilibrium
Profit Attracts Entry

- Profit falls from \((p_1 - \text{atc}_1) * q_1 = \) to Zero, \(P' = \text{ATC}\)
- To Zero, \(P' = \text{ATC}\)
Profit Maximizing in Long Run

- Note that price is driven down to the bottom of the ATC curve.
- In the long run, since profits MUST be zero, Average Revenue, AR = Average Cost, AC, or since AR = P, P = AC.
- Profit maximization implies MC = MR in perfect competition P = MR thus.
- P = MC = AC and MC = AC at the minimum of the AC curve.
Losses in the Short Run

- But what if there are losses in the short run?
- If there are any losses in the short run, firms will want to leave the industry.
- When firms leave, market supply decreases.
- This drives up price and drives down losses.
- Firms leave as long as there are losses. Once profits hit zero, firms stop leaving.
- Consider the earlier example.
Losses Lead to Exit

- Loss fall from \( (\text{atc}_1 - p_1)q_1 \) = 
- To Zero, where \( P' = \text{min ATC} \)
In the Long Run...

- In the Long Run in a perfectly competitive market...
  - there are ALWAYS zero profits
  - \( P = MC = ATC \)
  - The firm produces at the lowest possible average cost
Long Run Supply of the Firm Depends on Internal Economies/Diseconomies of Scale

- Remember the concept of Returns to Scale--The answer to the question “What happens to output if all inputs are scaled up or down proportionally?”
  - Increasing Returns to Scale--Output changes proportionally more than inputs
  - Constant Returns to Scale--Output changes in the same proportion as inputs
  - Decreasing Returns to Scale--Output changes proportionally less than inputs
Internal Returns to Scale

- So called “internal” because they depend on the firm’s production function
- With IRTS, average cost of the firm declines with increasing output
- With CRTS, average cost of the firm is constant as output increases
- With DRTS, average cost of the firm increases with increasing output
From Firm to Market

- If firms in an industry have production functions characterized by IRTS, the market long run supply is **downward sloping**
- If firms in an industry have production functions characterized by DRTS, the market long run supply is **upward sloping**
- If firms in an industry have production functions characterized by CRTS, the market long run supply is **horizontal**
Increasing Cost Industries

- An increasing cost industry, because as more firms enter the industry and the market quantity rises, the zero profit price rises.
- We can draw a Long Run Supply Curve which demonstrates the relationship between the long run quantity supplied and the zero profit price.
Market Supply Also Depends on “External” Economies/Diseconomies of Scale

- So called “external” because firm costs depend on market output
- Cost of a firm, \( C = f(q, Q) \)
  - ) \( C/Q > 0 \), Diseconomies of Scale
    - Cost curves of firm shift up as industry output expands
    - Also called Increasing Cost Industries
  - ) \( C/Q < 0 \), Economies of Scale
    - Cost curves of firm shift down as industry output expands
    - Also called Decreasing Cost Industries
Increasing Cost Industries

- If the industry is an increasing cost industry, the long run supply curve will be upward sloping - indicating that as the long run quantity increases, the zero profit price increases.
Constant Cost Industries

- But what if costs do not change as firms enter and leave the industry?
- Then the zero profit price will not change as quantity supplied in the long run changes.
- In this case the Long Run Supply Curve is flat
 Decreasing Cost Industries

- As more firms enter the industry and as the long run quantity supplied in the market increases, costs for the firms go down and thus the zero profit price is going down.
- This means the long run supply curve will be downward sloping.
Long Run Market Supply Curves

$Q/t$

$S$ (increasing cost)

$S$ (constant cost)

$S$ (decreasing cost)
The End