



Econ Dept, UMR

Presents

# 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

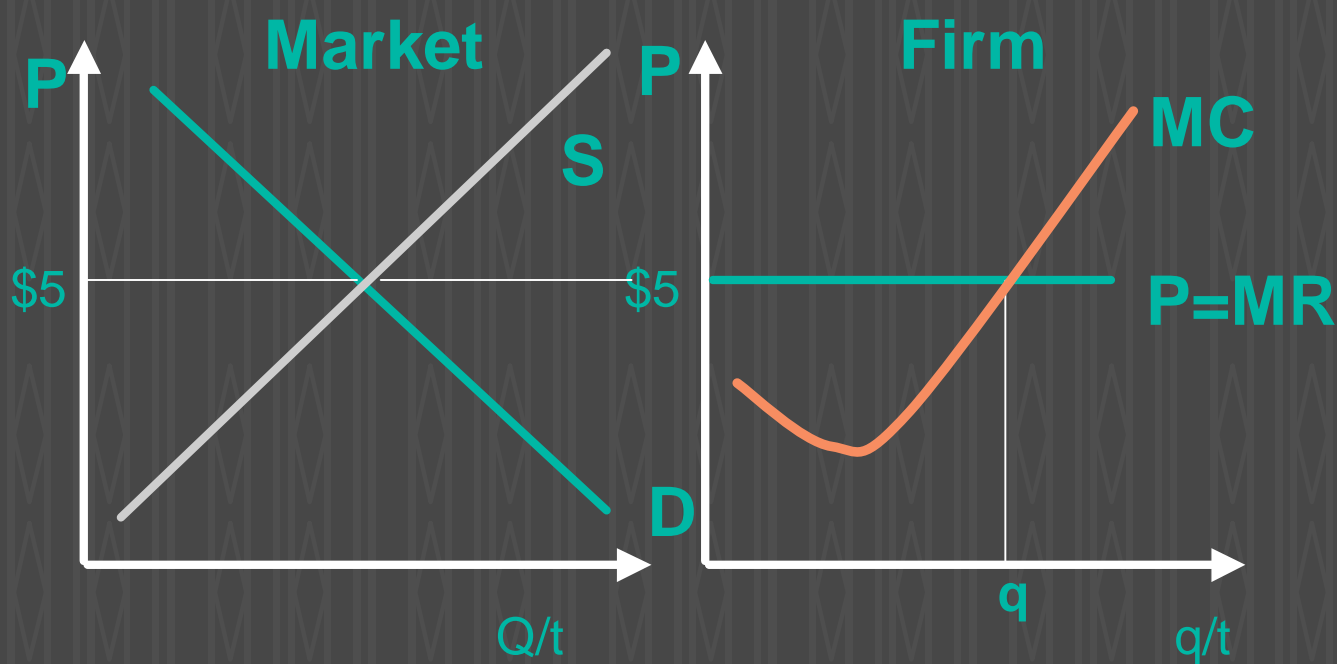
Question: How can we use what we know about production technology, costs, and competitive markets to make output decisions in the long run?



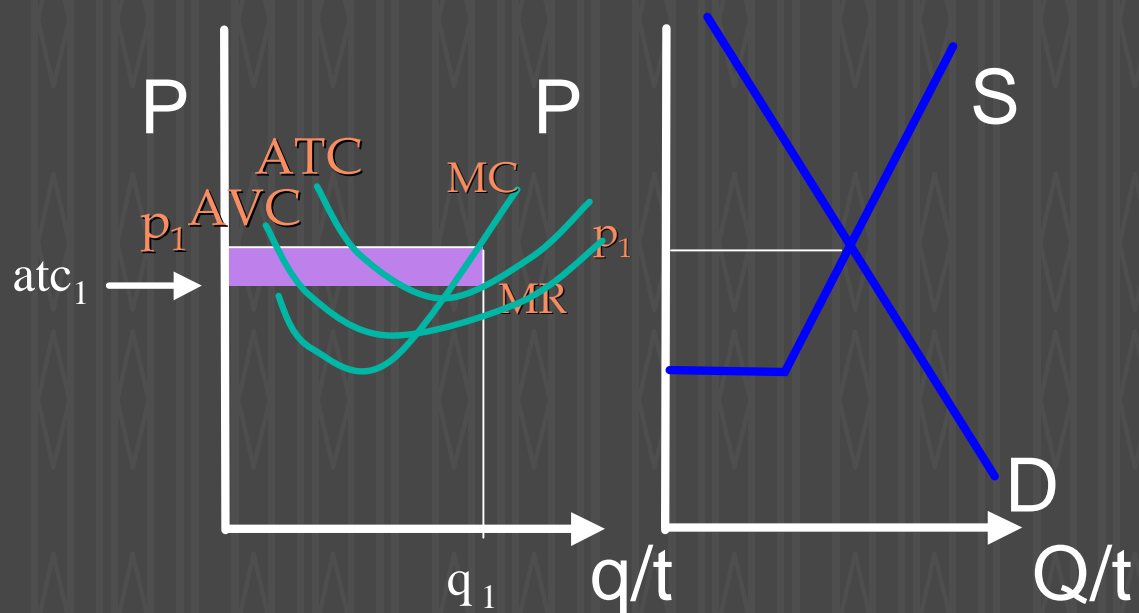
## Reminders...

- ◆ 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



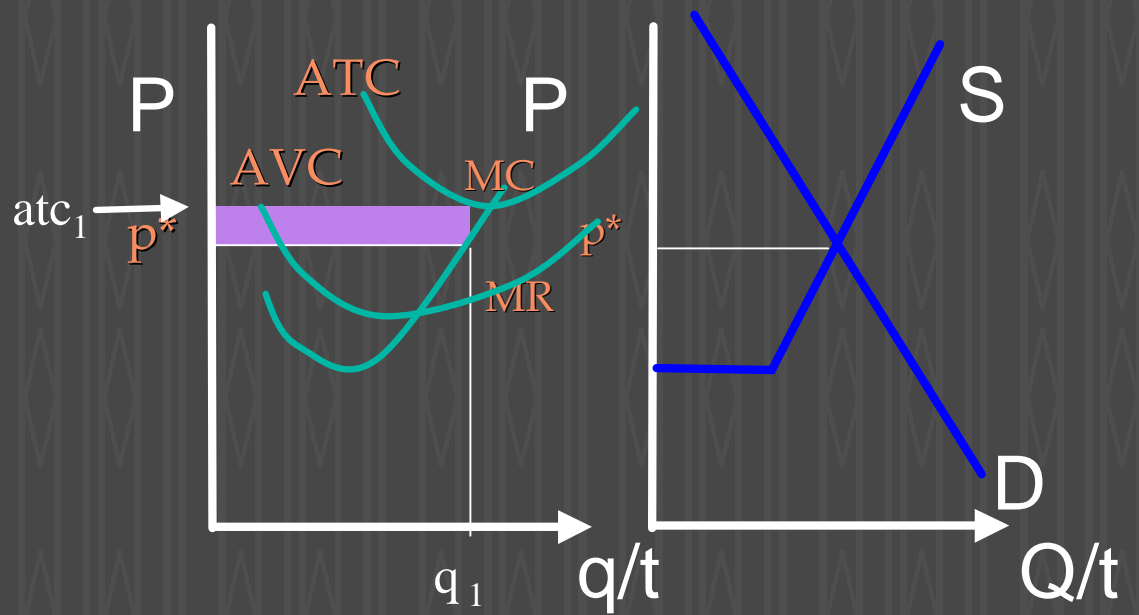
# Profit at $P_1$



◆ Profit!  $(p_1 - atc_1) * q_1 =$

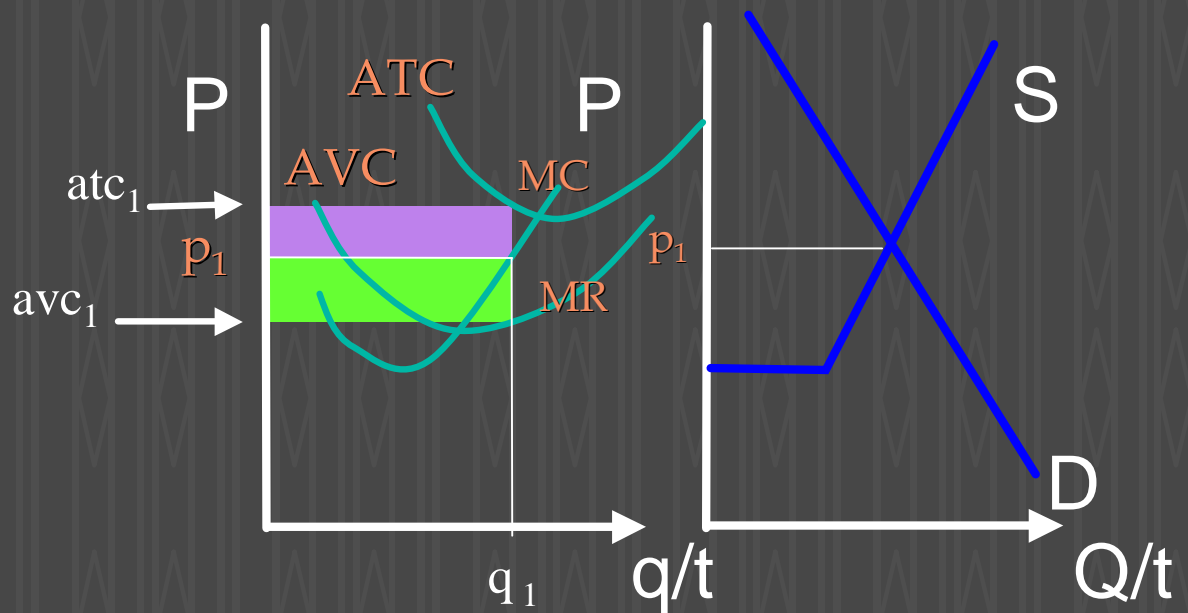


# Losses at $P^*$



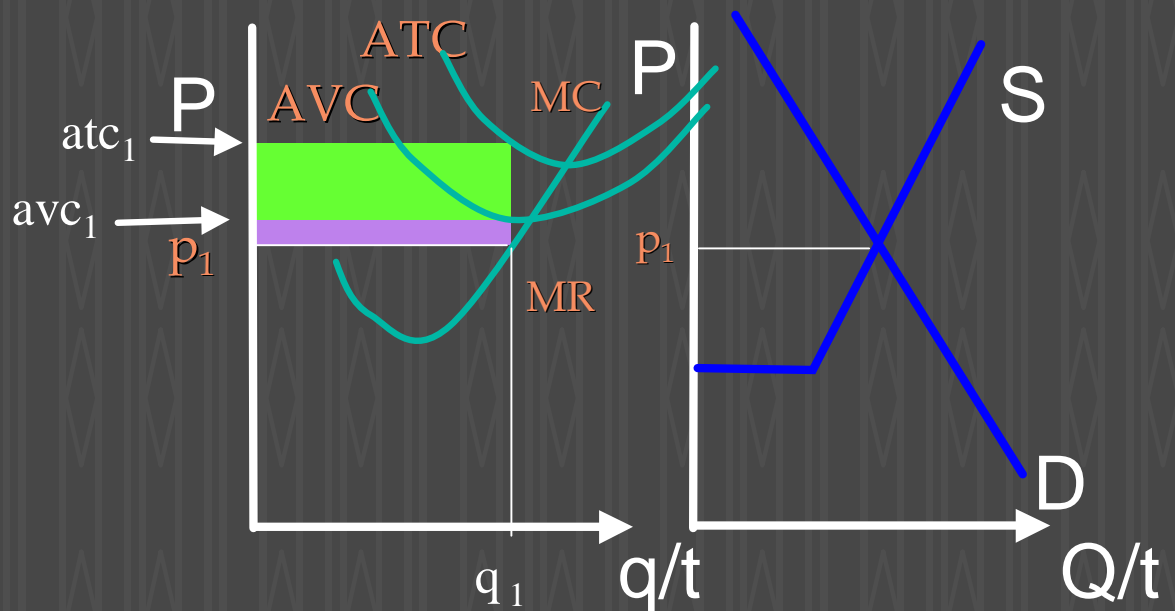
◆ Loss!  $(atc_1 - p^*) * q_1 =$

# 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,  $FC = (atc_1 - avc_1) * q_1 =$   is less than by operating at  $q_1$   $(atc_1 - p_1) * q_1 =$

# 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

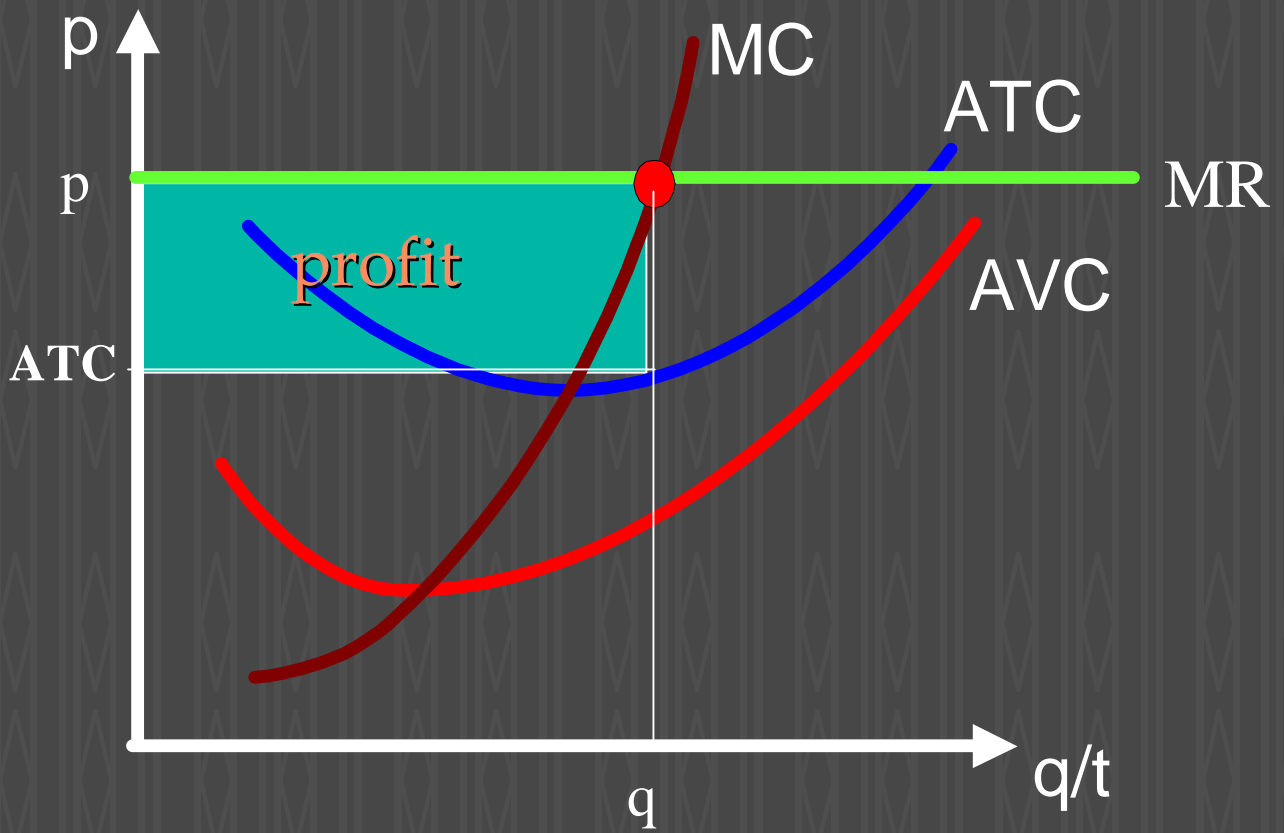
- ◆ Recall that the long run is defined as the time it takes for fixed costs to change. In other words - all costs are variable. The ATC curve equals the AVC curve
- ◆ Also recall that Perfect Competition assumes that there is costless entry and exit. In other words people can start up firms, expand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

$$\text{Profit} = (p - \text{ATC}) * q$$



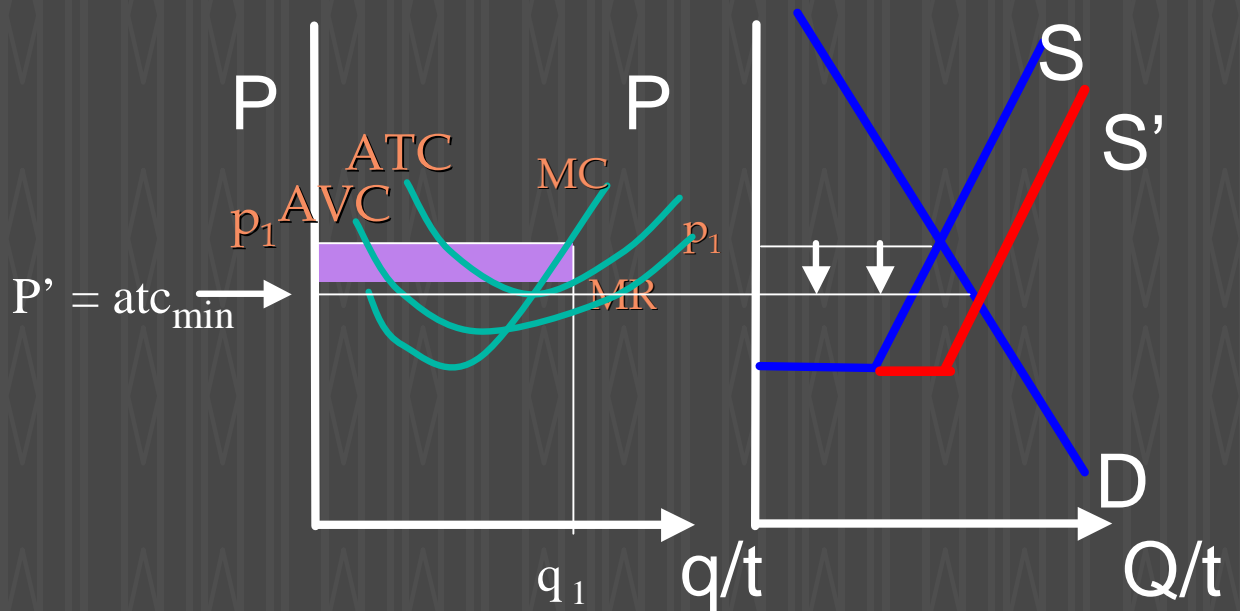


## Profit Maximizing in Long Run

- ◆ 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  $(p_1 - atc_1) * q_1 =$
- ◆ To Zero,  $P' = ATC$

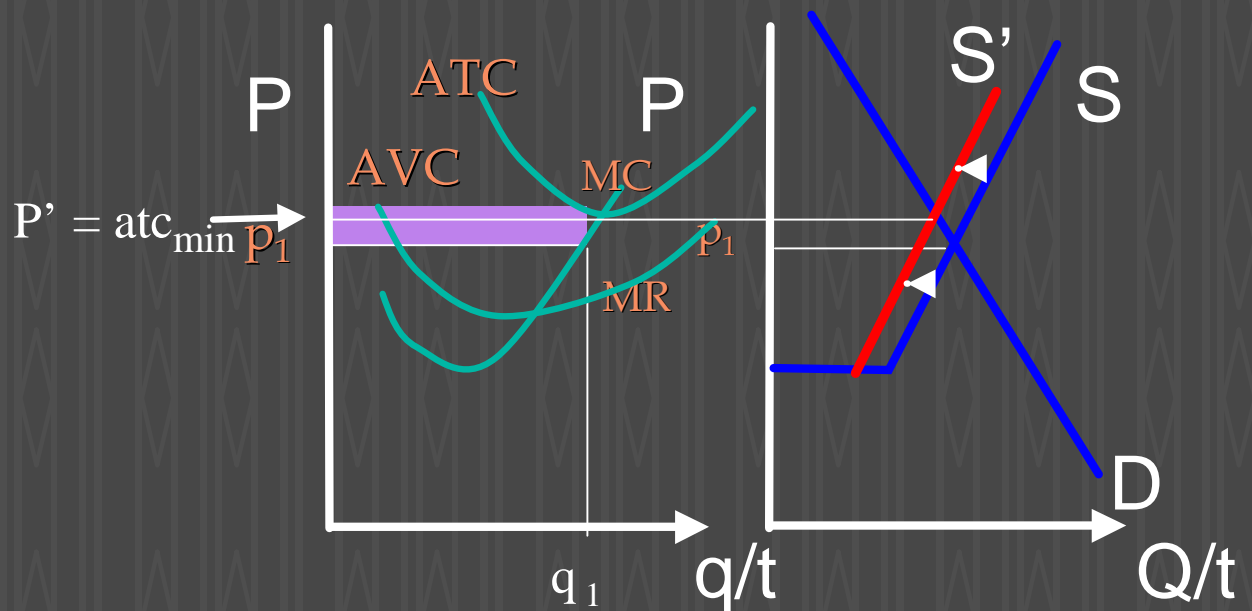
## Profit Maximizing in Long Run

- ◆ Note that price is driven down to the bottom of the ATC curve
- ◆ In the long run, since profits MUST be zero, Average Revenue,  $AR = \text{Average Cost, } AC$ , 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

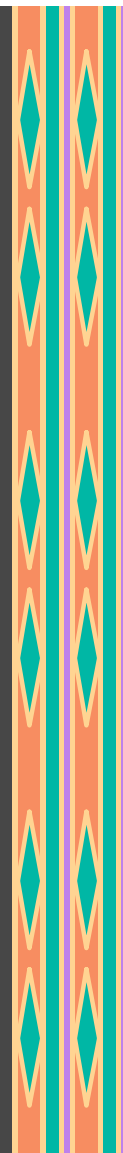
# Losses Lead to Exit



- ◆ Loss fall from  $(atc_1 - p_1) * q_1 =$
- ◆ To Zero, where  $P' = \min ATC$

## 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

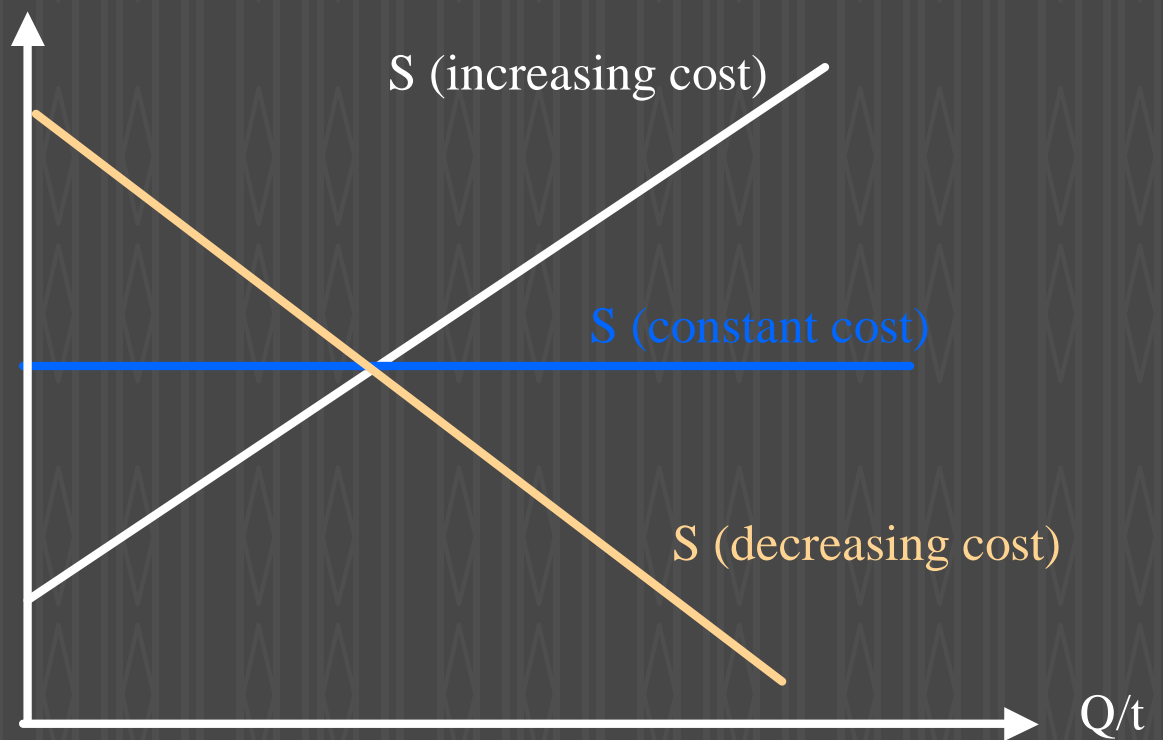
## Constant Cost Industries

- ◆ 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





The End