

## OUTLINE — September 30, 2019

- Firms' Supply Decisions, continued
  - Costs of Production (this is where we ended 9/19)
  - Perfect Competition
  - Produce  $q$  where  $MR=MC$  to maximize profit
  - Calculating Profit
  - If planning to exit in LR, Shut down or Produce in SR?
  - Supply curve is sum of MC curves above minimum AVC
- Profit = 0 in the Long Run in Perfect Competition

*Midterm #1: Wed 10/2 7 pm. Read the old midterms yet?*

## Costs: Marginal & Average

- ATC =
- MC =
- Marginal > Average?
- Marginal < Average?

Profit SR & LR Diminishing Marginal Returns Costs Industry Type Profit max rule

## Marginal & Average Cost Curves



Review Slides **Costs** Perf. Comp. Profit Shut Down S curve LR Profit=0

## Type of industry?

- Until now, it doesn't matter
- Assume
  - **PERFECTLY COMPETITIVE** Industry
    - 1) Lots of firms
    - 2) Homogeneous product
    - 3) No barriers to entry or exit

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## Perfectly Competitive Industry

- **Key idea:** Each firm faces a horizontal demand curve at the market equilibrium price



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## Market determines the price

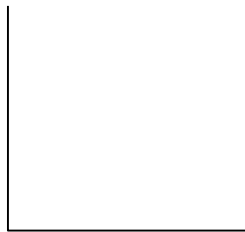
- Perfectly competitive firm can sell as much as it wants at market price
- Sell more? Additional revenue per unit = price
- Sell less? Lost revenue per unit = price

*When price is constant,  $MR = AR = p$*

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## Profit Max: choose q where $MR=MC$

- If  $MR > MC$ ,
- If  $MR < MC$ ,
- If  $MR = MC$ ,



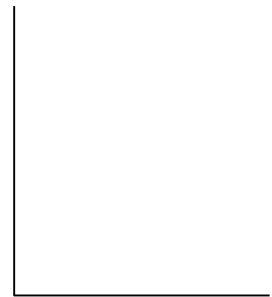
- **RULE:**  
To maximize profit, produce q so that  $MR = MC$

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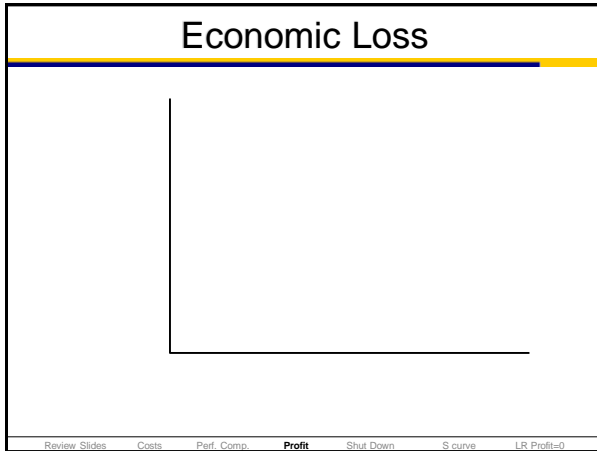
## How much Profit?

$$\pi = TR - TC$$

$$\pi = p \times q - ATC \times q$$



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Long Run	Short Run
<ul style="list-style-type: none"> <li>▪ Technique can be changed</li> <li>▪ Entry &amp; exit are possible</li> </ul> <div style="margin-left: 40px;"> <ul style="list-style-type: none"> <li>▪ Decision               <ul style="list-style-type: none"> <li>Exit</li> <li>Stay in Industry</li> </ul> </li> </ul> </div>	<ul style="list-style-type: none"> <li>▪ Technique is fixed</li> <li>▪ Entry &amp; exit are impossible</li> </ul> <div style="margin-left: 40px;"> <ul style="list-style-type: none"> <li>▪ Decision (if planning to exit)               <ul style="list-style-type: none"> <li>Produce</li> <li>Shut Down</li> </ul> </li> </ul> </div> <ul style="list-style-type: none"> <li>▪ Decision (if planning to stay, or if not shutting down): how much to produce?</li> </ul>
Review Slides   Costs   Perf. Comp.   Profit	<b>Shut Down</b> S curve   LR Profit=0

## Shutdown Point

Each month, a profit-maximizing business has

- TR = \$70,000
- Total Economic costs = \$105,000
  - TFC = \$75,000
  - TVC = \$30,000

What should this business do in the long run? In the short run?

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## Shutdown Point

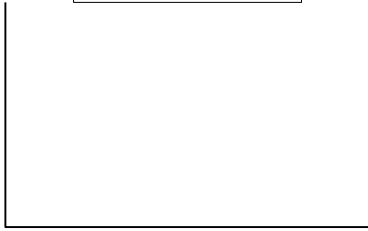
- *Relevant decision only if incurring economic loss*
- If **revenue > variable costs**, then **produce**
  - Firm is covering all its variable costs, and more
- If **revenue < variable costs**, then immediately **shut down**
  - Firm loses less by not producing & just paying fixed costs

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## Supply Curve is Sum of MC Curves

- Produce when  $p > AVC$
- Profit-max quantity: quantity where  $p = MC$

Individual Firm Supply



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## Entry & Exit in the Long Run

- $\pi = 0$ : "Normal profit"       $\pi > 0$ : "Abnormal profit"
- $\pi < 0$ : "Negative profit" or "Economic loss"
- $\pi > 0$ 
  - Firms enter industry *in the long run*
- $\pi < 0$ 
  - Some firms exit industry *in the long run*

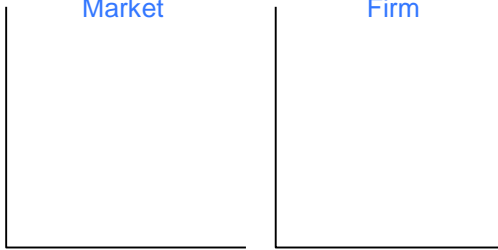
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## Free Entry Drives Profit to 0

Long-Run Competitive Equilibrium

Market

Firm

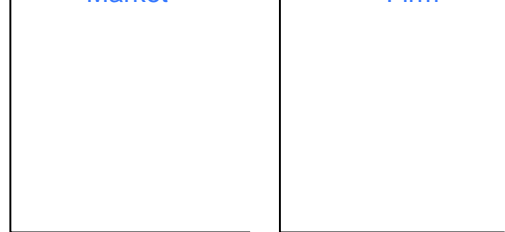


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## Example: Increase in Demand

Market

Firm



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## Typical firm earning profit?

- Abnormal profit?
- More firms will enter industry
  - Result?
    - Prices fall
    - Total quantity sold increases
      - Existing firms produce **less** than before
      - New firms produce **more** than 0

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## Increase in demand

- **Short run**
  - Price rises
  - Existing firms produce more
  - Profit > 0
- **Long run**
  - Firms enter
  - Price returns to  $p_1$
  - Market quantity increases
    - Existing firms cut production back to  $q_1$
    - New firms produce  $q > 0$
  - Profit = 0

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## Example: Increase in Variable Cost



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## Increase in variable cost

- **Short run**
  - MC rises (shifting market supply) and ATC rises
  - Price rises to  $p_2$
  - Existing firms produce less
  - Profit < 0
- **Long run**
  - Firms exit
  - Price rises to fully cover additional costs, to  $p_3$
  - Market quantity decreases
    - Remaining firms return production to  $q_1$
    - Fewer firms produce
  - Profit = 0

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