

## AP Micro Review Unit 3: Production, Cost, & Perfect Competition

### GOALS for 3.1, 3.2, 3.3

**Explain** (using graphs where appropriate) how production and cost are related in the short run and long run.

**Calculate** (using data from a graph or table as appropriate) the various measures of productivity and short-run and long-run costs.

### TOPIC 3.1: The Production Function

- The production function explains the relationship between inputs and outputs both in the short run and the long run.
- **Marginal product** and **average product** change as input usage changes, and hence, total product changes.
- **Diminishing marginal returns** occur as the firm employs more of one input, holding other inputs constant, to produce a product (output) in the short run.

### Diminishing Returns & the Production Function Video

### Marginal & Average Product, Diminishing Returns, and the 3 stages of Production PowerPoint

### TOPIC 3.2 Short-Run Production Costs

- In the short-run, firms cannot change fixed costs, only variable costs, and no firms can enter or exit the industry in the short run.
- Fixed costs (think rent, which you pay even if you produce nothing) + variable costs (think labor) = total cost.
- Marginal cost, average (fixed, variable, and total) cost, total cost, and total variable cost change as total output changes, but total fixed cost remains constant at all output levels, including zero output.
- Production functions with diminishing marginal returns yield an upward-sloping marginal cost curve.
- Specialization and the division of labor reduce marginal costs for firms.
- Cost curves can shift in response to changes in input costs and productivity.

Short-Run Costs (Part 1) on FC, VC, TC, MC, AVC, AFC, & ATC defined and calculated on a chart

Short-Run Cost Curves (Part 2) on graphing MC, ATC, AVC, & AFC and calculating using a graph

Short-Run Cost Curves (Part 3) WHY MC & ATC look like they do & WHY ATC/AVC cross MC at their min.

Welker: Relationships between a Firm's Short-run Costs of Production (MC, AVC, ATC) 9 minutes

### **TOPIC 3.3 Long-Run Production Costs**

- In the **long run**, firms can adjust all their inputs, and as a result, **all costs become variable**.
- The relationship between inputs and outputs in the long run is described by the scale of production—**increasing, decreasing, or constant returns to scale**.
- The **long-run average total cost** is characterized by **economies of scale, diseconomies of scale, or constant returns to scale** (efficient scale).
- The minimum efficient scale plays a role in determining the concentration of firms in a market and the market structure.
- You will **not** be required to draw the long-run average total cost curve (LRATC) on the AP exam.
- You should be able to understand the difference between
  - economies of scale, constant returns to scale, diseconomies of scale on a LRATC
  - identify it both graphically & numerically.

#### Long-Run Production Costs PowerPoint

#### Economies of Scale & Long-Run Costs Video

AP Central Practice Questions FRQ @ 1:00 min (first one goes with Agro island handout) and some multiple choice practice @ 20:00 min

#### Agro Island Question

### **TOPIC 3.4 Types of Profit**

Define the different types of profit (economic profit, accounting profit, normal profit, zero economic profit)

Explain how firms respond to profit opportunities

Calculate a firm's profit or loss

- Firms respond to economic profit (loss) rather than accounting profit.
- Accounting profit fails to account for implicit costs (such as cost of financial capital, compensation for risk, or an entrepreneur's time), which, if fully compensated, result in normal profit.

Mr. Clifford's short Profit Video reviews these terms and discusses why zero econ profits are good and considered a "normal profit"

AP Classroom Video 3.4 #2 starting at 2:22 has a good practice question dealing with costs (implicit and explicit) and profits for someone starting a business

### **TOPIC 3.5 Profit Maximization**

**Define** (using graphs or data as appropriate) the profit-maximizing rule (profits are maximized when  $MC=MR$  )

**Explain** (using a graph or data as appropriate) the profit-maximizing level of production

- Firms are assumed to produce output to maximize their profits by comparing marginal revenue and marginal cost. *On a graph, always start by finding where  $MC=MR$  regardless of market structure.*

[Mr. Clifford Practice Question on Profit Maximization using a chart](#)

### **TOPIC 3.6 Firms' Short-Run Decisions to Produce and Long-Run Decisions to Enter or Exit a Market**

**Explain** (using graphs or data where appropriate) firms' short-run decisions to produce positive output levels, or long-run decisions to enter or exit a market in response to profit-making opportunities.

- In the short run, firms decide to operate (i.e., produce positive output) or shut down (i.e., produce zero output) by comparing total revenue to total variable cost or price to average variable cost (AVC). [Welker Video on "Shut Down Rule" is great \(start at 2:12\) as is the "why" of the shut down rule" by Mr. Clifford](#)
- In the absence of barriers to entry or exit (Perfect Comp. & Monopolistic Comp.) in the long run (i.e., once factors that are fixed in the short run become variable), firms enter a market in which there are profit-making opportunities and exit a market when they anticipate economic losses.

[PowerPoint on Profit Maximization](#)

### **TOPIC 3.7 Perfect Competition**

[Every AP FRQ on Perfect Competition](#)

[Mr. Clifford 3.7 Review Video of PC](#)

**Define** (using graphs as appropriate) the characteristics of perfectly competitive markets and efficiency.

**Explain** (using graphs where appropriate) equilibrium and firm decision making in perfectly competitive markets and how prices in perfectly competitive markets lead to efficient outcomes

**Calculate** (using data from a graph or table as appropriate) economic profit (loss) in perfectly competitive markets.

- A perfectly competitive market is efficient. Firms in perfectly competitive markets face no barriers to entry and have no market power.  $D=S$  (no DWL)
- In perfectly competitive markets, firms can sell all their outputs at a **constant price** determined by the market [\(picture\)](#) They are a Price Taker
- At a competitive market equilibrium, firms are price takers and select output to maximize profit by producing the level of output where the marginal cost equals marginal revenue.

[Mr. Clifford's Perfect Competition in the Short Run](#) covers the first 3 bullet points above

- In a short-run competitive equilibrium, price can either be above or below its long-run competitive level resulting in profits or losses, motivating entry or exit of firms and moving prices and quantities toward long-run equilibrium. *This was reviewed in the shut down video*
- At a competitive market equilibrium, the price of a product equals both the private marginal benefit received by the last unit consumed and the private marginal cost incurred to produce the last unit, thus achieving allocative efficiency. *This just means that in the MARKET, DEMAND and SUPPLY EQUAL EACH OTHER (Otherwise known as Marginal private benefits and marginal private costs..... Which we just covered again in unit 6 when we introduces social benefits and costs with externalities)*
- In the **long-run** a perfectly competitive firm achieves both **productive efficiency** (Price = Minimum ATC) & **Allocative efficiency** (Price = MC &  $D=S$ ) and firms earn **zero economic profit or "normal profit"**. [Efficiency PowerPoint](#) showing this and why the short run doesn't meet both. *This is often tested by AP, so know the difference between productive efficiency and allocative efficiency*
- Firms may be in a constant cost, increasing cost, or decreasing cost industry. Long-run prices depend on the portion of the long-run cost curves on which firms operate. *Questions about increasing/decreasing cost industries have only been asked on one FRQ (2011 Form B) and one multiple choice in 2015. Students don't need to graph an increasing cost industry. A typical question will state "assume a constant cost industry blah blah blah...., so don't get thrown off.*

[Mr. Clifford's Perfect Competition in the Long Run Video](#)

[From Short Run to Long Run PowerPoint and Practice Questions](#)

[AP FRQ question that covers Costs, Profits, S-run & L-run.... A great gauge on 3.1 to 3.5](#)

*Now go back to the top of 3.7 and try some more of the Perfect Competition AP FRQs*