Costs
Part 2

The Costs of Production

- There are many different types of costs.
- Invariably, firms believe costs are too high and try to lower them.

Fixed Costs, Variable Costs, and Total Costs

- **Fixed costs** are those that are spent and cannot be changed in the period of time under consideration.
  - In the long run there are no fixed costs since all costs are variable.
  - In the short run, a number of costs will be fixed.

Fixed Costs, Variable Costs, and Total Costs

- Workers represent **variable costs** – those that change as output changes.
Fixed Costs, Variable Costs, and Total Costs

- The sum of the variable and fixed costs are total costs.

\[ TC = FC + VC \]

Average Costs

- Much of the firm’s discussion is of average cost.

Average Costs

- **Average fixed cost** equals fixed cost divided by quantity produced.

\[ AFC = FC/Q \]

- **Average variable cost** equals variable cost divided by quantity produced.

\[ AVC = VC/Q \]
Average Costs

- Average total cost can also be thought of as the sum of average fixed cost and average variable cost.

\[ ATC = AFC + AVC \]

Marginal Cost

- **Marginal cost** is the increase (decrease) in total cost of increasing (or decreasing) the level of output by one unit.
- In deciding how many units to produce, the most important variable is marginal cost.

The Cost of Producing Earrings

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Graphing Cost Curves

- To gain a greater understanding of these concepts, it is a good idea to draw a graph.
- Quantity is put on the horizontal axis and a dollar measure of various costs on the vertical axis.
Total Cost Curves

- The total variable cost curve has the same shape as the total cost curve—increasing output increases variable cost.

Average and Marginal Cost Curves

- The marginal cost curve goes through the minimum point of the average total cost curve and average variable cost curve.
- Each of these curves is U-shaped.
### Average and Marginal Cost Curves

- The average fixed cost curve slopes down continuously.

### Downward-Sloping Shape of the Average Fixed Cost Curve

- The average fixed cost curve looks like a child’s slide – it starts out with a steep decline, then it becomes flatter and flatter.
- It tells us that as output increases, the same fixed cost can be spread out over a wider range of output.

### The U Shape of the Average and Marginal Cost Curves

- When output is increased in the short-run, it can only be done by increasing the variable input.

### The Law of Diminishing Marginal Productivity

- The law of diminishing marginal productivity sets in as more and more of a variable input is added to a fixed input.
- Marginal and average productivities fall and marginal costs rise.
The U Shape of the Average and Marginal Cost Curves

- And when average productivity of the variable input falls, average variable cost rise.

The U Shape of the Average and Marginal Cost Curves

- The average total cost curve is the vertical summation of the average fixed cost curve and the average variable cost curve.

The U Shape of the Average and Marginal Cost Curves

- If the firm increased output enormously, the average variable cost curve and the average total cost curve would almost meet.

- The firm’s eye is focused on average total cost—it wants to keep it low.
Per Unit Output Cost Curves

The Relationship Between Productivity and Costs

- The shapes of the cost curves are mirror-image reflections of the shapes of the corresponding productivity curves.

The Relationship Between Productivity and Costs

- When one is increasing, the other is decreasing.
- When one is at a maximum, the other is at a minimum.
Relationship Between Marginal and Average Costs

- The marginal cost and average cost curves are related.
  - When marginal cost exceeds average cost, average cost must be rising.
  - When marginal cost is less than average cost, average cost must be falling.

Relationship Between Marginal and Average Costs

- Marginal cost curves always intersect average cost curves at the minimum of the average cost curve.

Relationship Between Marginal and Average Costs

- The position of the marginal cost relative to average total cost tells us whether average total cost is rising or falling.

Relationship Between Marginal and Average Costs

- To summarize:
  - If $MC > ATC$, then $ATC$ is rising.
  - If $MC = ATC$, then $ATC$ is at its low point.
  - If $MC < ATC$, then $ATC$ is falling.
Relationship Between Marginal and Average Costs

- Marginal and average total cost reflect a general relationship that also holds for marginal cost and average variable cost.
  
  *If MC > AVC, then AVC is rising.*
  *If MC = AVC, then AVC is at its low point.*
  *If MC < AVC, then AVC is falling.*

- As long as average variable cost does not rise by more than average fixed cost falls, average total cost will fall when marginal cost is above average variable cost,