The Envelope Relationship

- In the long run all inputs are flexible, while in the short run some inputs are not flexible.
- As a result, long-run cost will always be less than or equal to short-run cost.

The Envelope Relationship

- In the short run the firm faces an additional constraint – all expansion must proceed using only the variable input.
- These additional constraints increase cost.

The Envelope Relationship

- The *envelope relationship* explains that:
  - At the planned output level, short-run average total cost equals long-run average total cost.
  - At all other levels of output, short-run average total cost is higher than long-run average total cost.
Entrepreneurial Activity and the Supply Decision

- Profit is what underlies the dynamics of production in a market economy.
- The expected price must exceed the opportunity cost of supplying the good for a good to be supplied.
Entrepreneurial Activity and the Supply Decision

• An **entrepreneur** is an individual who sees an opportunity to sell an item at a price higher than the average cost of producing it.

Entrepreneurial Activity and the Supply Decision

• Entrepreneurs organize production.

• They visualize the demand and convince the individuals who own the factors of production that they want to produce those goods.

Using Cost Analysis in the Real World

• Some of the problems of using cost analysis in the real world include the following:
  – Economies of scope.
  – Learning by doing and technological change.
  – Many dimensions.
  – Unmeasured costs.

Economies of Scope

• The cost of production of one product often depends on what other products a firm is producing.
Economies of Scope

- There are *economies of scope* when the costs of producing goods are interdependent so that it is less costly for a firm to produce one good when it is already producing another.

Economies of Scope

- Firms look for both economies of scope and economies of scale.
- Economies of scope play an important role in firms’ decisions of what combination of goods to produce.

Economies of Scope

- Globalization has made economies of scope even more important to firms in their production decisions.

Learning by Doing and Technological Change

- Production techniques available to real-world firms are constantly changing because of learning by doing and technological change.
- These changes occur over time and cannot be accurately predicted.
Learning by Doing and Technological Change

- *Learning by doing* means that as we do something, we learn what works and doesn't, and over time we become more proficient at it.

- Many firms estimate worker productivity to grow 1 to 2 percent a year because of learning by doing.

Learning by Doing and Technological Change

- *Technological change* is an increase in the range of production techniques that provides new ways to producing goods.

- Technological change can fundamentally alter the nature of production costs.
Learning by Doing and Technological Change

- Technological change occurs in all industries, not only high-tech industries.

Learning by Doing and Technological Change

- In many businesses, the effect of learning by doing and technological change on prices is built into the firm's pricing structure.

Learning by Doing and Technological Change

- Technological change and learning by doing are intricately related.

Many Dimensions

- Most decisions that firms make involve more than one dimension.
- The only dimension in the standard model is the level of output.
- Good economic decisions take all relevant marginal costs and benefits into account.
Many Dimensions

- The important thing to remember in using the standard model is the reasoning, not the specific model.

Unmeasured Costs

- The relevant costs as defined by economists are not the costs found in a firm’s books.
- Economists include opportunity costs while accountants use explicit costs that can be measured.

Economists Include Opportunity Cost

- Economists insists on including the business owner’s opportunity cost.
- The business owner's opportunity cost includes forgone income that the owner could have earned by spending his or her time in another job.

Economic Versus Accounting Depreciation

- Economic depreciation differs from accounting depreciation.
Economic Versus Accounting Depreciation

- In measuring the costs of depreciable assets, accountants insist on using historical costs—what a depreciable item costs in terms of money actually spent for it—as the cost basis.

- If the depreciable asset increased in value, accountants would still use the historical cost basis while an economist would count its increased value as revenue.

The Standard Model as a Framework

- Despite its limitations, the standard model provides a good framework for cost analysis.
- It can be expanded to include real-world complications.

Summary

- An economically efficient production process must be technically efficient, but a technically efficient process may not be economically efficient.
- The long-run average total cost curve is U-shaped because economies of scale cause average total cost to decrease; diseconomies of scale eventually cause average total cost to increase.
Summary

• Marginal cost and short-run average cost curves slope upward because of diminishing marginal productivity.
• The long-run average cost curve slopes upward because of diseconomies of scale.
• The envelope relationship between short-run and long-run average cost curves shows that the short-run average cost curves are always above the long-run average cost curve.

Review Question 10-1 Why are short-run and long-run average cost curves U-shaped?

The short-run average cost curves are U-shaped because of diminishing marginal productivity. The long-run average cost curves are U-shaped because of economies and diseconomies of scale.

Review Question 10-2 Suppose that capital and labor both cost $5 per unit. Currently the firm is using 4 workers and 4 machines to produce an output of 40 units. If the firm wants to produce 100 units of output, it can be done using the 4 machines and 25 workers or with 10 machines and 10 workers.

a. In the short run, how much capital and how much labor will the firm use? What is the total cost and the average cost of the 100 units?

In the short run, the firm can not change capital, the fixed input, so it must use 4 machines and 25 workers. Total cost = $5x4 + $5x25 = $145. Average cost = $145/100 = $1.45

b. In the long run, both inputs are variable, so the firm will minimize costs with 10 workers and 10 machines. Total cost = $5x10 + $5x10 = $100 and long-run average cost = $100/100 = $1.

Summary

• An entrepreneur is an individual who sees an opportunity to sell an item at a price higher than the average cost of producing it.
• Costs in the real world are affected by:
  – Economies of scope
  – Learning by doing and technological change
  – Many dimensions to output
  – Unmeasured costs, such as opportunity costs