

# 第十三章 Chapter 13

## 生产成本 The Costs of Production

# 生产成本

## The Costs of Production

供给定律 The Law of Supply:

当某一物品的价格更高时，企业愿意生产和销售更多的该种物品。

Firms are willing to produce and sell a greater quantity of a good when the price of the good is high.

其结果就是供给曲线向上倾斜。

This results in a supply curve that slopes upward.

考察企业行为有助于更好地理解市场供给曲线背后的决策。

Examining firm behavior will give you a better understanding of what decisions lie behind the supply curve in a market.

# 企业的目标

## The Firm's Objective

企业的经济目标是追求利润最大。

The economic goal of the firm is to maximize profits.



# 企业的总收益与总成本

## A Firm's Total Revenue and Total Cost

### 总收益 Total Revenue

企业出售其产出而得到的金额。

The amount that the firm receives for the sale of its output.

### 总成本 Total Cost

企业购买其投入所支付的金额。

The amount that the firm pays to buy inputs.

# 企业的利润

## A Firm's Profit

**利润**就是企业的总收益减去它的总成本。  
**Profit** is the firm's total revenue minus its total cost.

$$\text{利润} = \text{总收益} - \text{总成本}$$
$$\text{Profit} = \text{Total revenue} - \text{Total cost}$$

# 作为机会成本的成本

## Costs as Opportunity Costs

一个企业的生产成本包括其生产物品与服务的所有机会成本。

A firm's cost of production includes all the opportunity costs of making its output of goods and services.

# 显性和隐性成本

## Explicit and Implicit Costs

企业的生产成本包括显性成本和隐性成本。 A firm's cost of production include explicit costs and implicit costs.

显性成本包括对生产要素直接的资金支出。  
Explicit costs involve a direct money outlay for factors of production.

隐性成本不涉及直接的资金支出。  
Implicit costs do not involve a direct money outlay.

# 显性和隐性成本

## Explicit and Implicit Costs

### 隐性成本的例子

#### Examples of Implicit costs

✎ 企业主将自有资金投资企业（而非储蓄）  
A firm owner invests his own money into the firm (vs. owns as savings).

✎ 农民工自己种田（而非雇人）  
A migrate worker farms by himself (vs. hires a labor).



# 经济利润和会计利润

## Economic Profit versus Accounting Profit

- 📖 经济学家衡量的是企业的**经济利润**，它是总收益减去所有的机会成本（显性和隐性的）。 Economists measure a firm's **economic profit** as total revenue minus all the opportunity costs (explicit and implicit).
- 📖 会计师衡量的是**会计利润**，它是企业的总收益仅减去显性成本。也即他们忽略了隐性成本。 Accountants measure the **accounting profit** as the firm's total revenue minus only the firm's explicit costs. In other words, they ignore the implicit costs.

# 经济利润和会计利润

## Economic Profit versus Accounting Profit

✎ 当总收益超过显性和隐性成本之和，企业就获得了经济利润。

When total revenue exceeds both explicit and implicit costs, the firm earns economic profit.

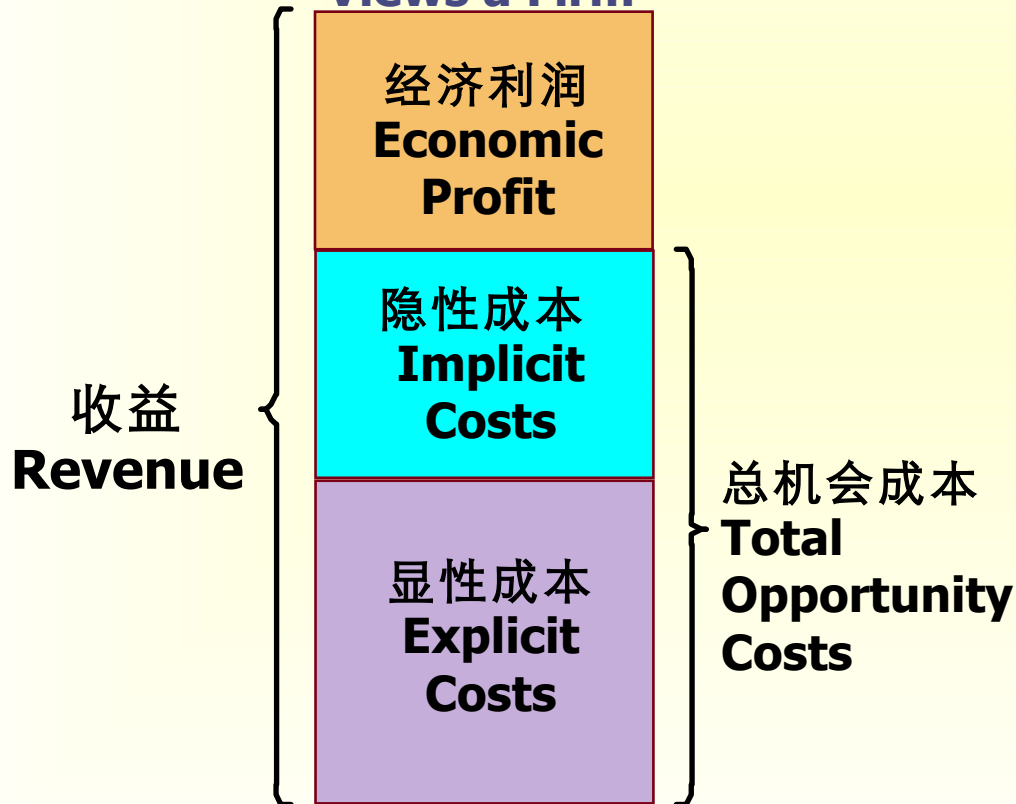
✎ 经济利润小于会计利润。

Economic profit is smaller than accounting profit.

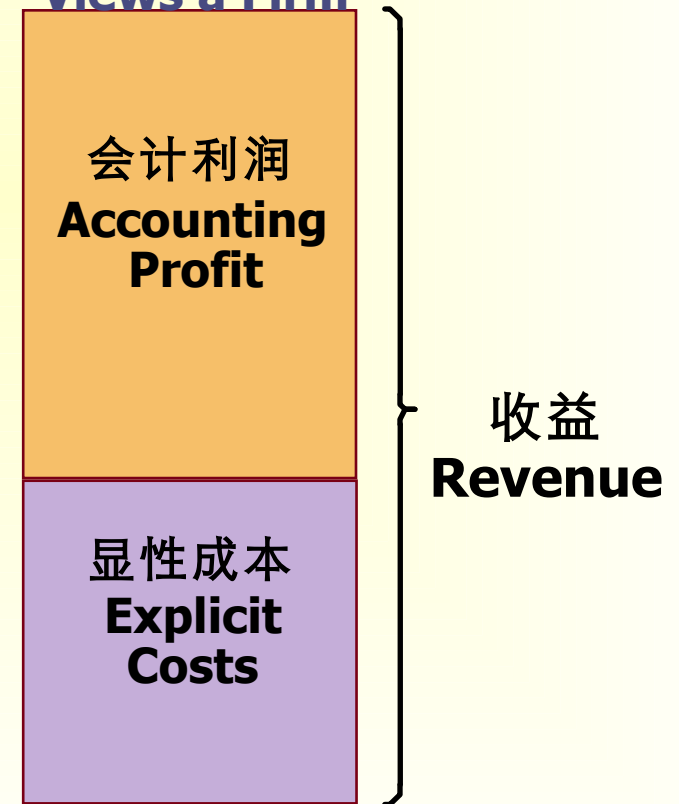
# 经济利润和会计利润

## Economic Profit versus Accounting Profit

经济学家如何看企业  
How an Economist  
Views a Firm



会计师如何看企业  
How an Accountant  
Views a Firm



# 例： EVA 与作为机会成本的资本成本

- 传统的公司业绩衡量以会计利润为核心，只考虑以利息形式表现的债务融资成本，而忽略了股权资本的机会成本。
- 这一衡量方法容易导致企业过多进行股权投资，以换取会计利润的增长。
- EVA（Economic Value Added，经济增加值）考虑股东投入股本的机会成本，即股东投资于其他风险程度类似的企业所获取的利益。

$$\begin{aligned} & \text{经济增加值 (EVA)} \\ &= \text{税后净营业利润} - \text{资本使用成本} \end{aligned}$$

# 例： EVA 与作为机会成本的资本成本

从会计报表上看， 2002 年 1214 家中国上市公司平均会计净利润为 6428 万元，即是普遍盈利的。

用 EVA 衡量方法来看， 2002 年中国上市公司的平均 EVA 为 -1564 万元，即是普遍亏损的。只有 1/3 的上市公司 EVA 为正数，即真正为股东带来了（超额）利润。

（来源：“谁创造财富，谁毁灭财富－2002 年中国上市公司价值创造和毁灭排行榜”，思腾思特 (Stern Stewart & Co) 发布，《财经》杂志，2003 年 11 月 05 日，83－94 页。）

# 生产与成本

## Production and Costs

考虑饥饿海伦的糕点厂.....

*Consider Hungry Helen's Cookie Factory.....*

工人数量      产量      劳动的边际产量      工厂成本      工人成本      投入总成本

Number of Workers	Output	Marginal Product of Labor	Cost of Factory	Cost of Workers	Total Cost of Inputs
0	0		\$30	\$0	\$30
1	50	50	30	10	40
2	90	40	30	20	50
3	120	30	30	30	60
4	140	20	30	40	70
5	150	10	30	50	80

# 生产函数

## The Production Function

**生产函数**表示生产某物品所使用的投入的数量和该物品产出的数量之间的关系。

The **production function** shows the relationship between quantity of inputs used to make a good and the quantity of output of that good.

# 边际产量

## Marginal Product

在生产过程中，任一投入的**边际产量**，就是从增加一单位的该种投入中所获得的产量的增加量。

The **marginal product** of any input in the production process is the increase in the quantity of output obtained from an additional unit of that input.



# 边际产量 Marginal Product

$$\begin{array}{l} \text{边际产量} \\ \text{Marginal} \\ \text{product} \end{array} = \frac{\begin{array}{l} \text{增加的产出} \\ \text{Additional output} \end{array}}{\begin{array}{l} \text{增加的投入} \\ \text{Additional input} \end{array}}$$

# 边际产量递减

## Diminishing Marginal Product

✧ **边际产量递减**指的是某投入的边际产量随其投入量增加而下降的性质。

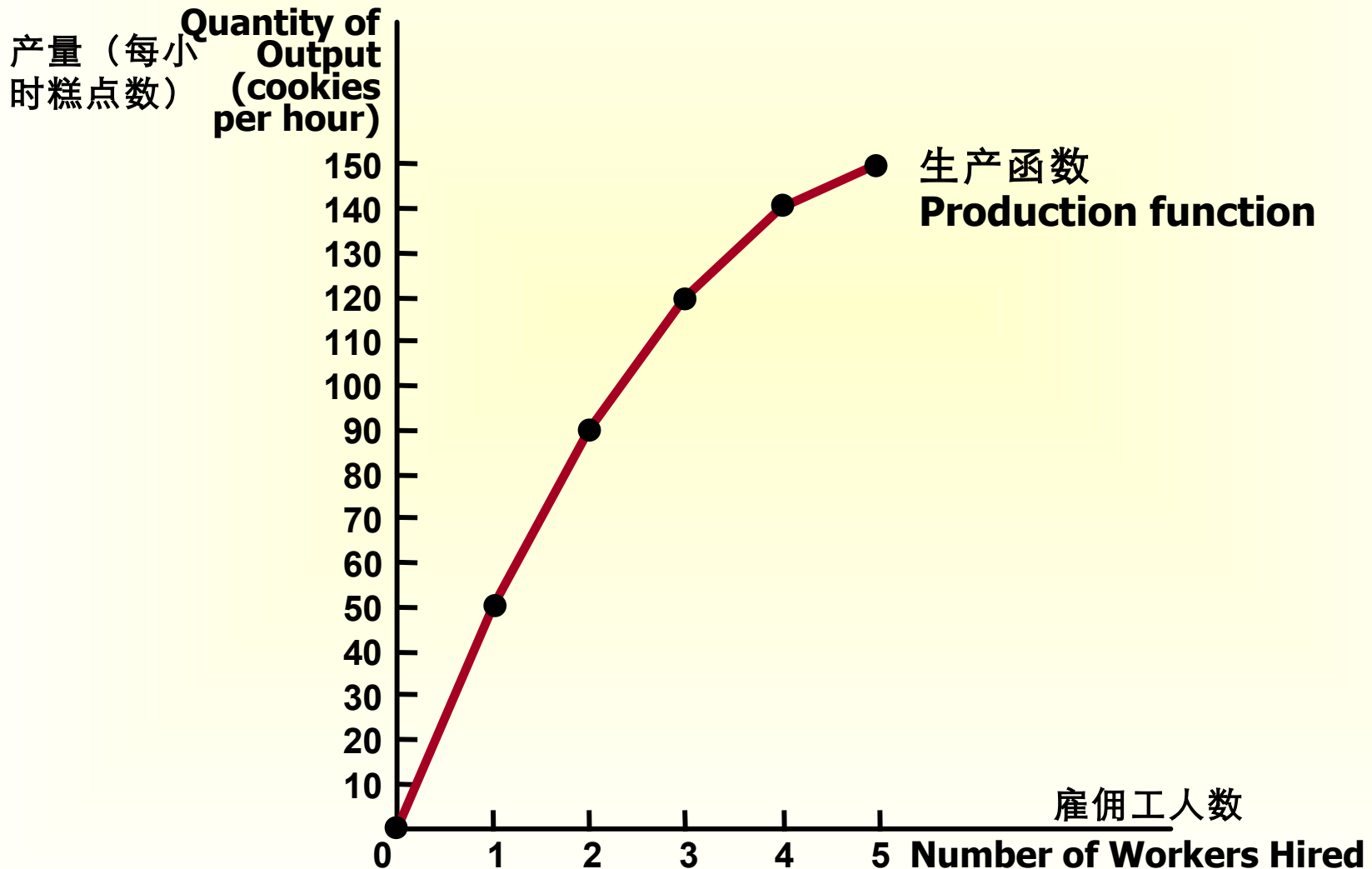
**Diminishing marginal product** is the property whereby the marginal product of an input declines as the quantity of the input increases.

✧ **例：**随着一个企业雇佣的工人越来越多，每一个新增的工人对产量的贡献就越来越小，因为企业拥有的设备数量是有限的。

**Example:** As more and more workers are hired at a firm, each additional worker contributes less and less to production because the firm has a limited amount of equipment.

# 生产函数

## *A Production Function...*



# 边际产量递减

## Diminishing Marginal Product

✎ 生产函数的斜率衡量了某一投入（如工人）的边际产量。

The slope of the production function measures the marginal product of an input, such as a worker.

✎ 当边际产量递减时，生产函数变得越来越平坦。

When the marginal product declines, the production function becomes flatter.

# 边际产量递减的应用： 马尔萨斯的“人口论”



托马斯·马尔萨斯在其《人口论》（1798）年中指出，随着人口的增长和更多的劳动力对土地进行耕作，地球上有限数量的土地不足以供给足够的食物，最终会导致大规模的饥荒和死亡。

# 边际产量递减的应用： 马尔萨斯的“人口论”

- ☞ 食物的生产有两种主要的投入：土地和劳动
- ☞ 由于土地面积固定，因此劳动的边际产量递减。
- ☞ 随着人口（劳动力）的不断增长，劳动的边际产量递减最终导致劳动的平均产量递减。
- ☞ 劳动的平均产量递减导致每个人平均的食物供给量递减，人类由此可能出现生存危机。

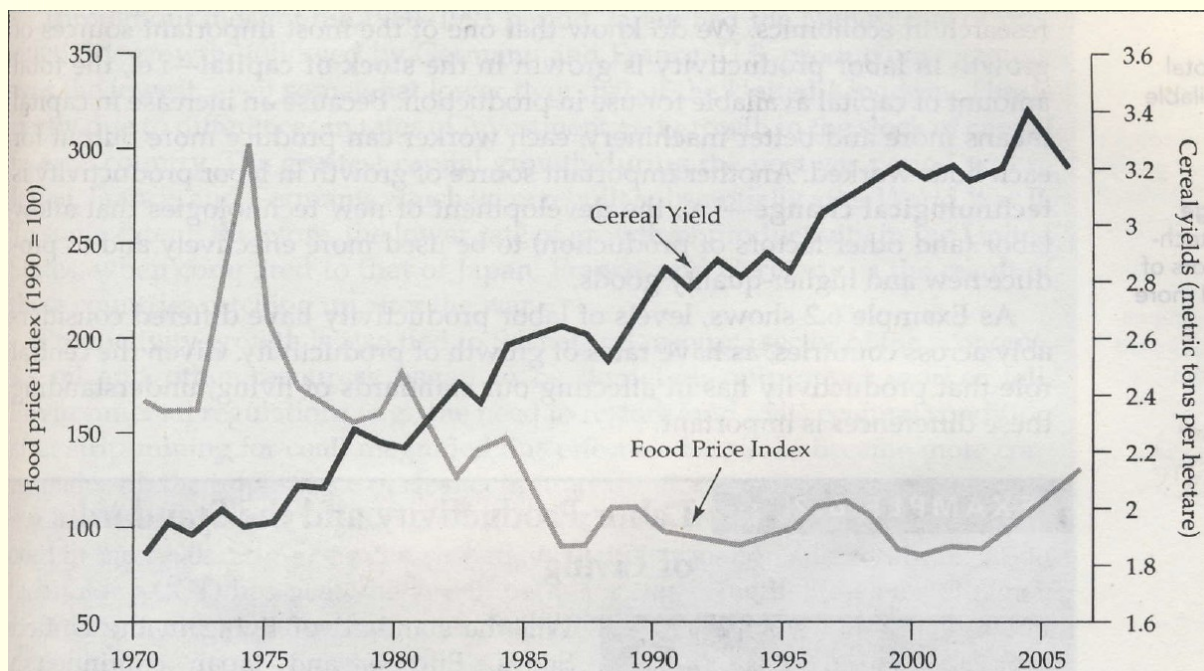
# 边际产量递减的应用： 马尔萨斯的“人口论”

为什么马尔萨斯的预言没有实现？

土地面积实际上增加了，更重要的是，农业技术大为提高了，这促使世界上大部分地区劳动的边际产量和平均产量提高（生产函数曲线上移）。

但是，马尔萨斯的逻辑对于控制人口增长的政府政策仍然有指导意义。

# 边际产量递减的应用： 马尔萨斯的“人口论”



**FIGURE 6.3** Cereal Yields and the World Price of Food

Cereal yields have increased. The average world price of food increased temporarily in the early 1970s but has declined since.

谷物的单位面积产量逐步提高，而其世界价格也逐步下降。



# 从生产函数到总成本曲线

## From the Production Function to the Total-Cost Curve

✎ 一个企业能够生产的数量与其成本之间的关系，决定着它的生产与价格决策。  
The relationship between the quantity a firm can produce and its costs determines its production and pricing decisions.

✎ **总成本曲线**用图形表示了这一关系。  
The *total-cost curve* shows this relationship graphically.

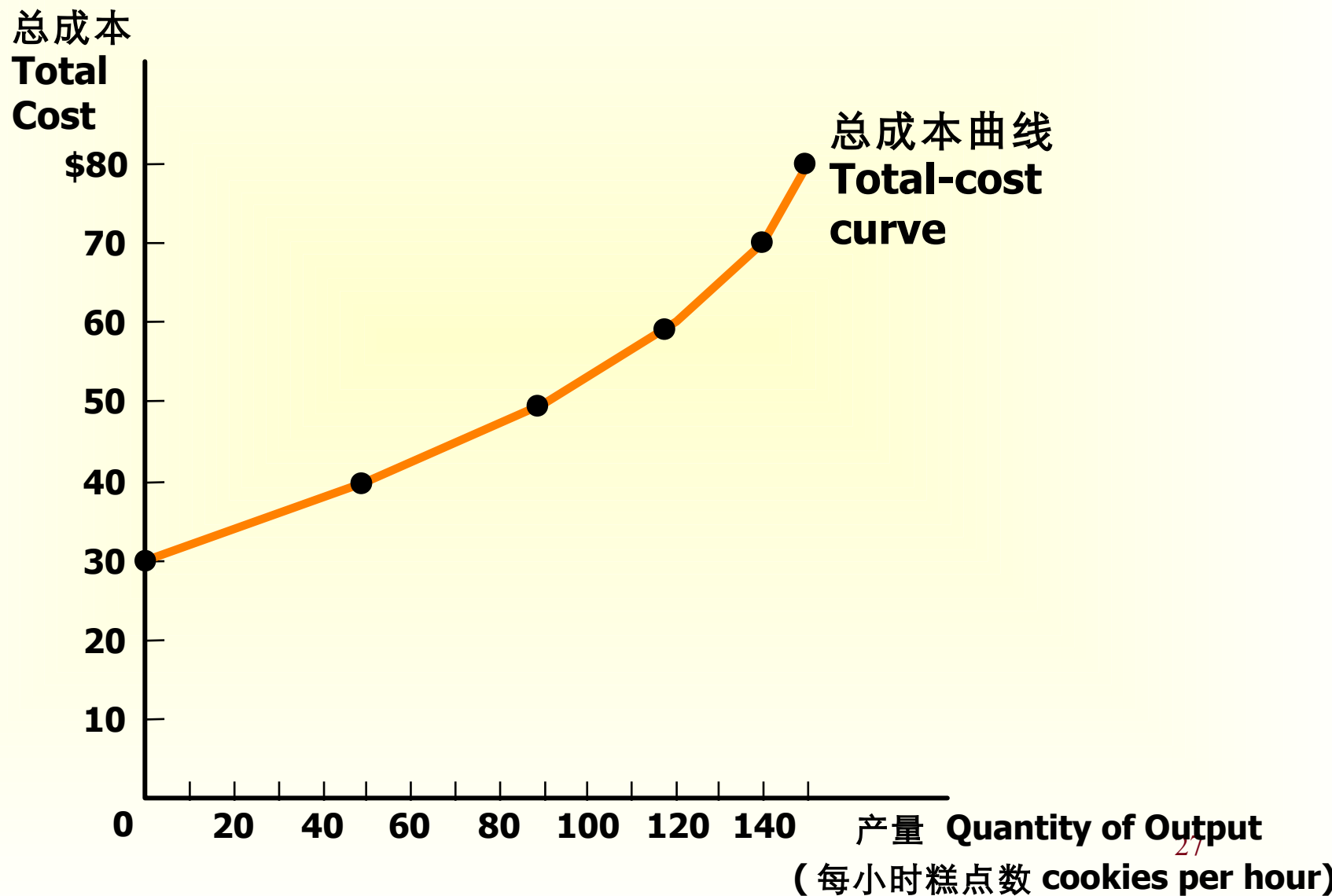
# 生产函数与总成本

## A Production Function and Total Cost

工人数量	产量	劳动的边际产量	工厂成本	工人成本	投入总成本
Number of Workers	Output	Marginal Product of Labor	Cost of Factory	Cost of Workers	Total Cost of Inputs
0	0		\$30	\$0	\$30
1	50	50	30	10	40
2	90	40	30	20	50
3	120	30	30	30	60
4	140	20	30	40	70
5	150	10	30	50	80

饥饿海伦的糕点厂 Hungry Helen's Cookie Factory

# 总成本曲线 *Total-Cost Curve...*



# 总成本曲线

## Total-Cost Curve

ㄎ 总成本曲线的形状反映了生产函数的形状。

The shape of the total-cost curve reflects the shape of the production function.

ㄎ 边际产量递减的特点意味着随着工人数量增加，每个增加的工人增加的产量减少了，生产函数变得平坦。

Diminishing marginal product means that as the number of workers rises, each additional worker adds *less* to the production and the *flattening* of the production function.

ㄎ 现在把这个逻辑反转过来：随着产量增加，每增加一单位产量要求雇佣的工人增加了，总成本曲线越来越陡峭。  
Now turn this logic around: As the quantity produced rises, producing an additional product required *more* workers hired, thus the total-cost curve becomes *steeper*.

# 成本的不同衡量方法

## The Various Measures of Cost

生产成本可以分解为固定成本和可变成本。

Costs of production may be divided into fixed costs and variable costs.

# 固定和可变成本

## Fixed and Variable Costs

📖 **固定成本**是指那些不随生产的产品数量改变而改变的成本。

**Fixed costs** are those costs that do *not* vary with the quantity of output produced.

📖 **可变成本**是指那些随企业改变生产产品数量而变化的成本。

**Variable costs** are those costs that *do* change as the firm alters the quantity of output produced.

# 总成本一族

## Family of Total Costs

总固定成本 Total Fixed Costs (TFC)

总变动成本 Total Variable Costs (TVC)

总成本 Total Costs (TC)

总成本 = 总固定成本 + 总变动成本

$$TC = TFC + TVC$$

# 总成本一族

## Family of Total Costs

口渴西尔玛的柠檬水店

### Thirsty Thelma's Lemonade Stand

Quantity	Total Cost	Fixed Cost	Variable Cost
0	\$ 3.00	\$3.00	\$ 0.00
1	3.30	3.00	0.30
2	3.80	3.00	0.80
3	4.50	3.00	1.50
4	5.40	3.00	2.40
5	6.50	3.00	3.50
6	7.80	3.00	4.80
7	9.30	3.00	6.30
8	11.00	3.00	8.00
9	12.90	3.00	9.90
10	15.00	3.00	12.00



# 平均成本

## Average Costs

平均成本由企业的成本除以生产产品的数量得出。

**Average costs** can be determined by dividing the firm's costs by the quantity of output produced.

平均成本是典型一单位产品的成本。

The average cost is the cost of each typical unit of product.

# 平均成本一族

## Family of Average Costs

平均固定成本 Average Fixed Costs (AFC)

平均可变成本 Average Variable Costs (AVC)

平均总成本 Average Total Costs (ATC)

平均总成本 = 平均固定成本 + 平均可变成本  
 $ATC = AFC + AVC$

# 平均成本一族

## Family of Average Costs

$$AFC = \frac{\text{固定成本} \quad \text{Fixed cost}}{\text{数量} \quad \text{Quantity}} = \frac{FC}{Q}$$

$$AVC = \frac{\text{可变成本} \quad \text{Variable cost}}{\text{数量} \quad \text{Quantity}} = \frac{VC}{Q}$$

$$ATC = \frac{\text{总成本} \quad \text{Total cost}}{\text{数量} \quad \text{Quantity}} = \frac{TC}{Q}$$

# 平均成本一族

## Family of Average Costs

Quantity	AFC	AVC	ATC
0	—	—	—
1	\$3.00	\$0.30	\$3.30
2	1.50	0.40	1.90
3	1.00	0.50	1.50
4	0.75	0.60	1.35
5	0.60	0.70	1.30
6	0.50	0.80	1.30
7	0.43	0.90	1.33
8	0.38	1.00	1.38
9	0.33	1.10	1.43
10	0.30	1.20	1.50

# 边际成本

## Marginal Cost

📖 边际成本（MC）衡量的是当企业增加一单位产量时总成本的增加量。

**Marginal cost (MC)** measures the amount total cost rises when the firm increases production by one unit.

📖 边际成本有助于回答下面的问题：  
**Marginal cost helps answer the following question:**

📖 生产额外一单位产量的成本是多少？

How much does it cost to produce an additional unit of output?

# 边际成本

## Marginal Cost

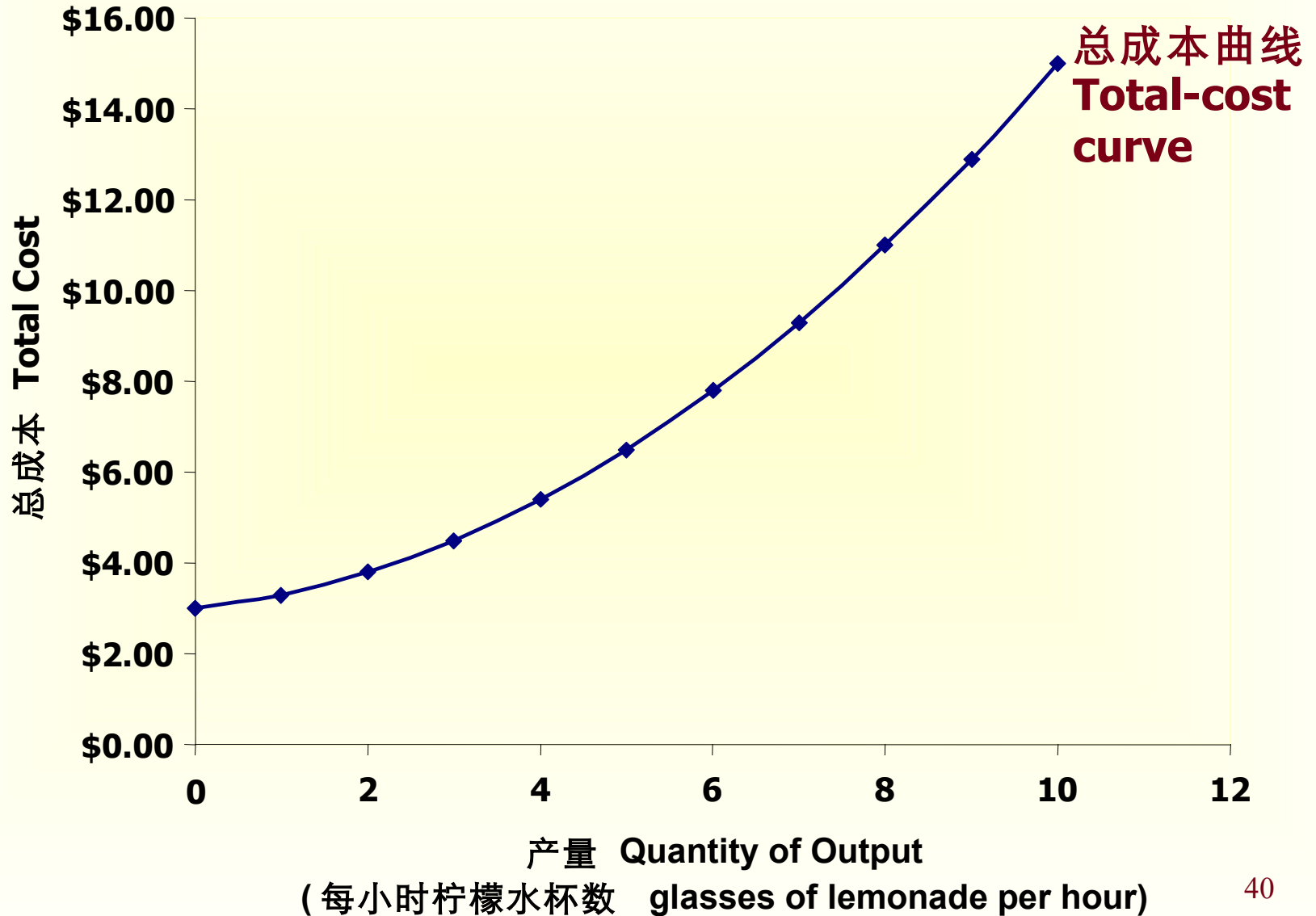
$$\begin{aligned} \text{MC} &= \frac{\text{总成本变动量}}{\text{产量变动量}} \\ &= \frac{\text{(Change in total cost)}}{\text{(Change in quantity)}} \\ &= \frac{\Delta \text{TC}}{\Delta \text{Q}} \end{aligned}$$

# 边际成本

## Marginal Cost

数量	总成本	边际成本	数量	总成本	边际成本
Quantity	Total Cost	Marginal Cost	Quantity	Total Cost	Marginal Cost
0	\$3.00	—			
1	3.30	\$0.30	6	\$7.80	\$1.30
2	3.80	0.50	7	9.30	1.50
3	4.50	0.70	8	11.00	1.70
4	5.40	0.90	9	12.90	1.90
5	6.50	1.10	10	15.00	2.10

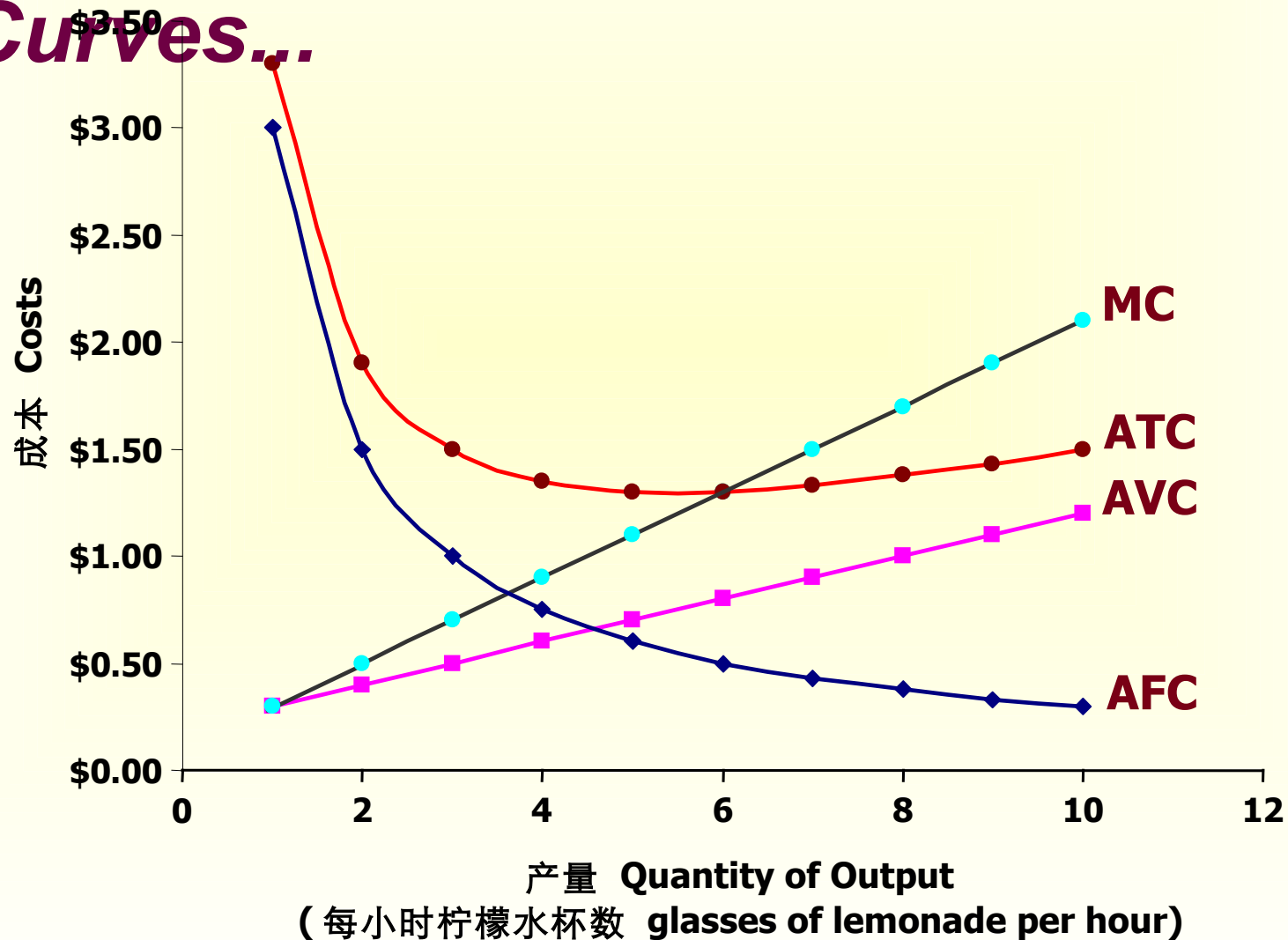
# 总成本曲线 Total-Cost Curve...





# 平均成本和边际成本曲线

## Average-Cost and Marginal-Cost Curves...



# 成本曲线及其形状

## Cost Curves and Their Shapes

边际成本随产量上升而上升。

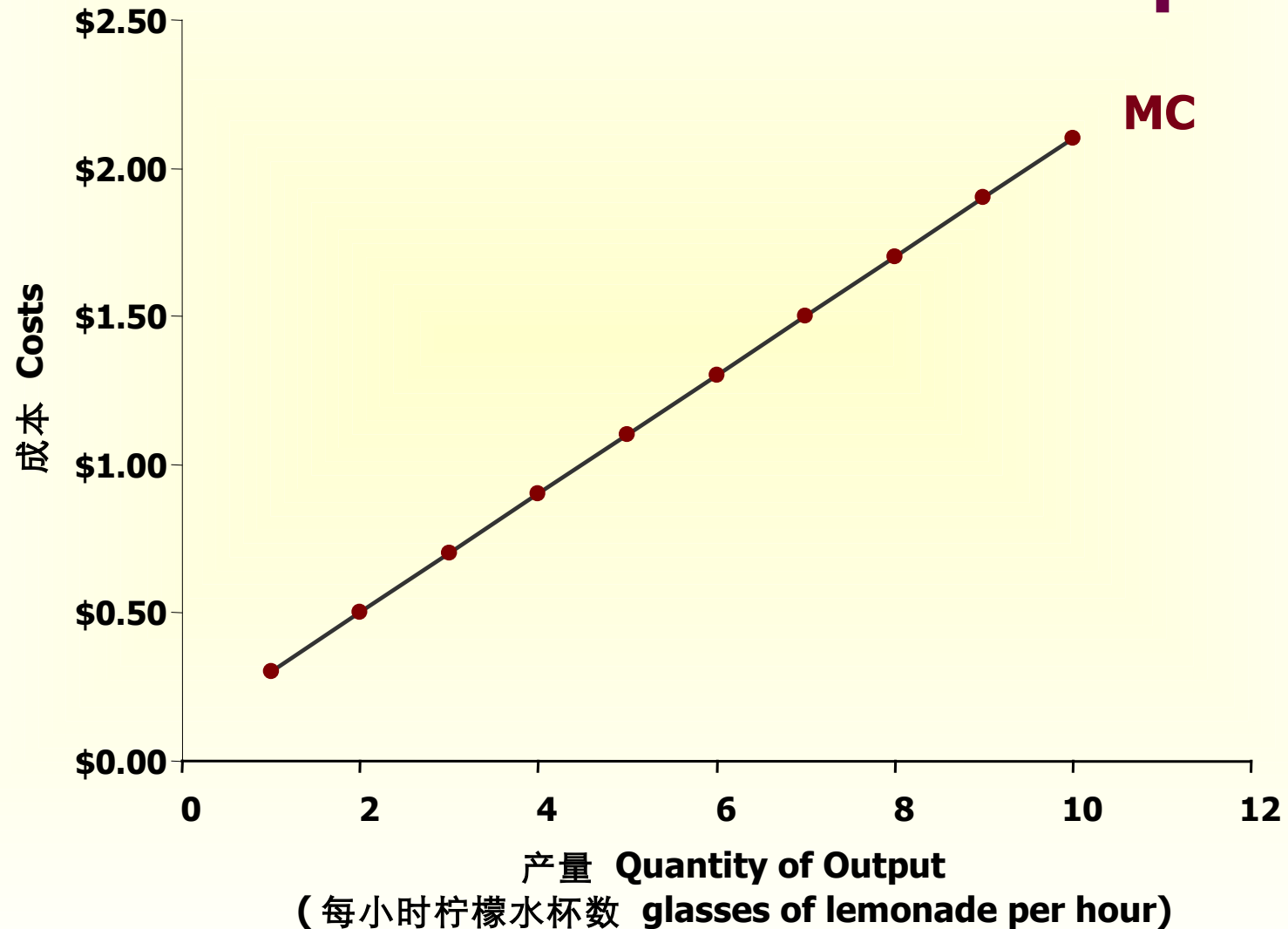
**Marginal cost** rises with the amount of output produced.

✎ 它反映了边际产量递减的性质

。 This reflects the property of *diminishing marginal product*.

# 成本曲线及其形状

## Cost Curves and Their Shapes



# 成本曲线及其形状

## Cost Curves and Their Shapes

平均总成本曲线为 U 形。

The **average total-cost** curve is U-shaped.

当产量很低时，平均总成本很高，因为固定成本分摊到仅有的几单位产量上。

At very low levels of output average total cost is high because fixed cost is spread over only a few units.

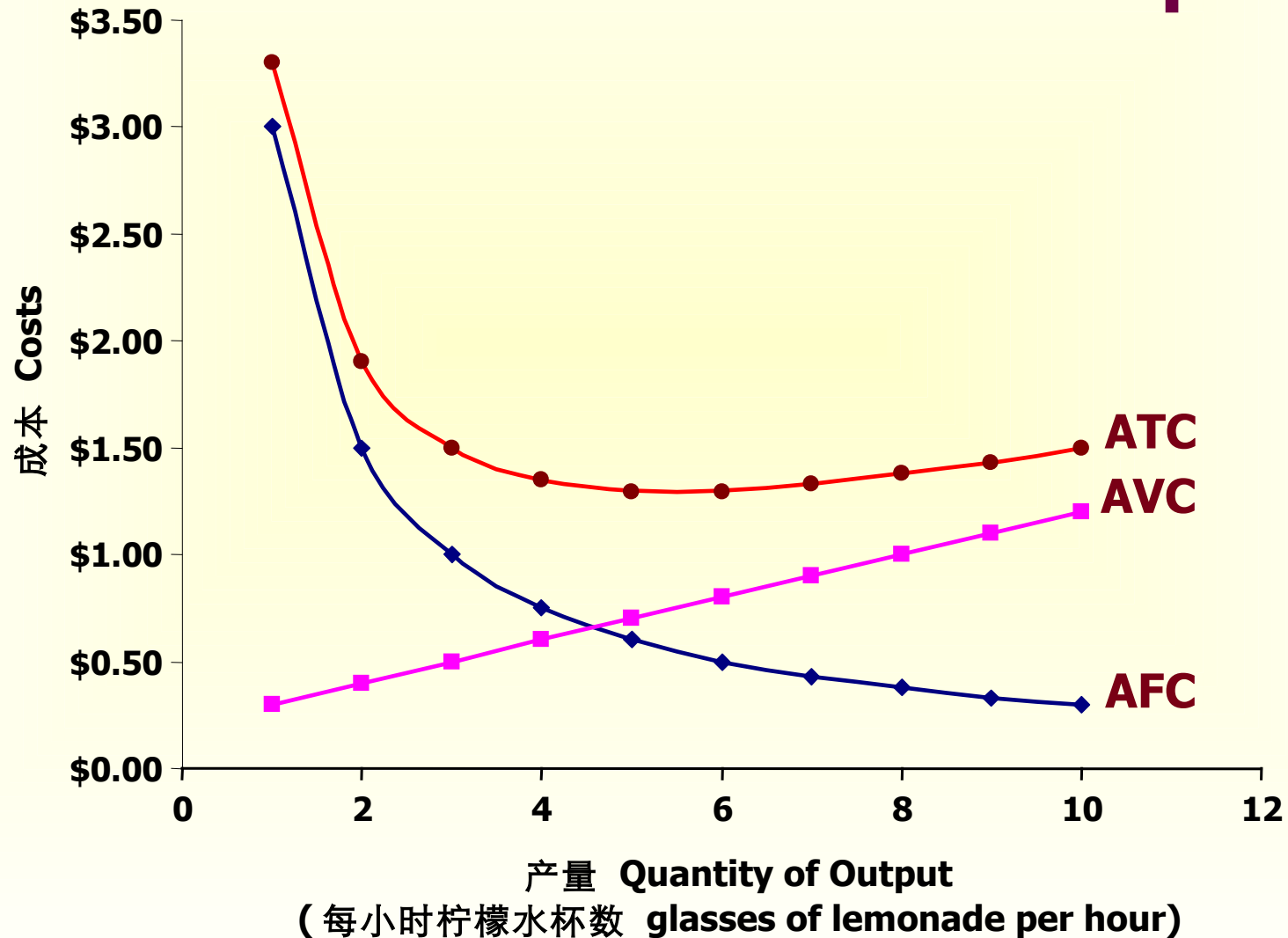
当产量增加时，平均总成本下降。

Average total cost declines as output increases.

平均总成本开始上升，因为平均可变成本大幅度上升了。 Average total cost starts rising because average variable cost rises substantially.

# 成本曲线及其形状

## Cost Curves and Their Shapes



# 成本曲线及其形状

## Cost Curves and Their Shapes

U 形曲线的底部出现在使平均总成本最小的产量处。这一产量有时被称作企业的**有效率规模**。

The bottom of the U-shape occurs at the quantity that *minimizes average total cost*. This quantity is sometimes called the **efficient scale** of the firm.

# 边际成本和平均总成本之间的关系

## Relationship Between Marginal Cost and Average Total Cost

✎ 只要边际成本小于平均总成本，平均总成本就是下降的。

Whenever marginal cost is less than average total cost, average total cost is falling.

✎ 只要边际成本大于平均总成本，平均总成本就是上升的。

Whenever marginal cost is greater than average total cost, average total cost is rising.

# 边际成本和平均总成本之间的关系

## Relationship Between Marginal Cost and Average Total Cost

边际成本曲线与平均总成本曲线在有效率规模处相交。

The marginal-cost curve crosses the average-total-cost curve at the **efficient scale**.

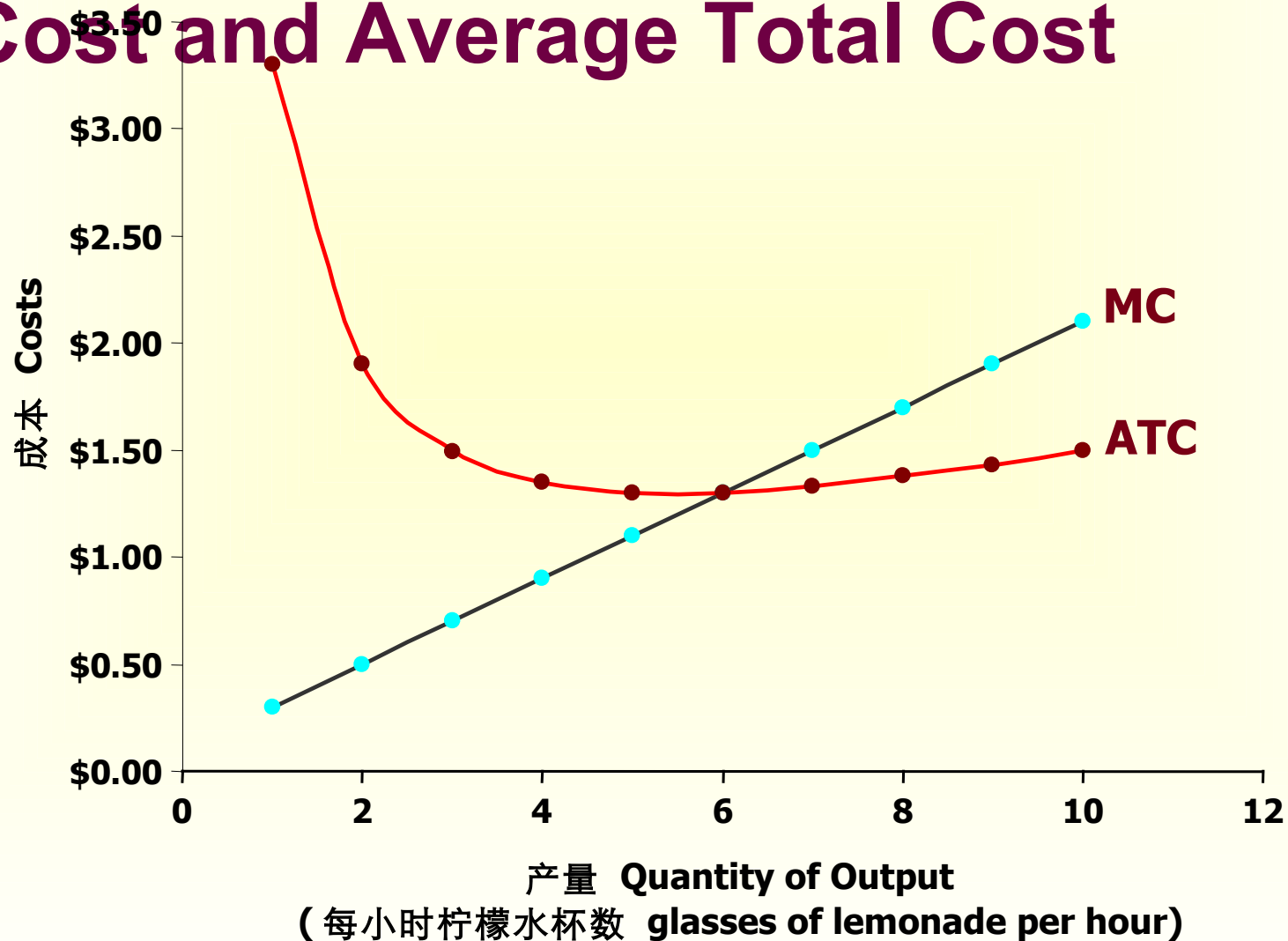
有效率规模是使平均总成本最小的产量。

Efficient scale is the quantity that minimizes average total cost.



# 边际成本和平均总成本的关系

## Relationship Between Marginal Cost and Average Total Cost



# 成本的各种衡量方法

## The Various Measures of Cost

	总成本 ( TC )	固定成本 ( FC )	可变成本 ( VC )
总成本 ( TC )	总成本	总固定成本 ( TFC )	总可变成本 ( TVC )
平均成本 ( AC )	平均总成本 ( ATC )	平均固定成本 ( AFC )	平均可变成本 ( AVC )
边际成本 ( MC )	边际成本 ( MC )	零	边际成本 ( MC )

# 成本的各种衡量方法

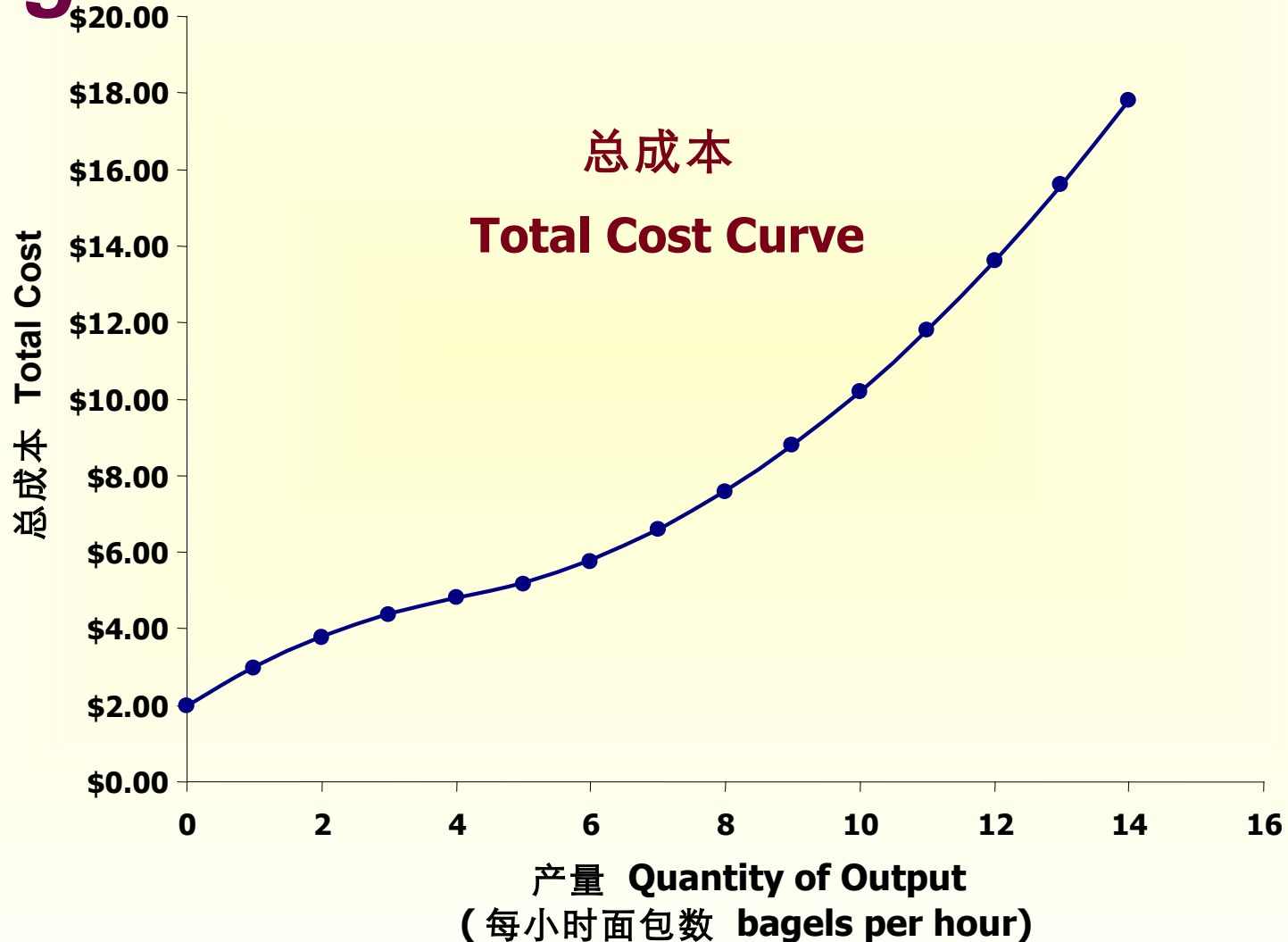
## The Various Measures of Cost

### 大鲍勃的面包房 Big Bob's Bagel Bin

面包圈数量	总成本	固定成本	可变成本	平均固定成本	平均可变成本	平均总成本	边际成本
Quantity of Bagels	Total Cost	Fixed Cost	Variable Cost	Average Fixed Cost	Average Variable Cost	Average Total Cost	Marginal Cost
0	\$2.00	\$2.00	\$0.00				
1	\$3.00	\$2.00	\$1.00	\$2.00	\$1.00	\$3.00	\$1.00
2	\$3.80	\$2.00	\$1.80	\$1.00	\$0.90	\$1.90	\$0.80
3	\$4.40	\$2.00	\$2.40	\$0.67	\$0.80	\$1.47	\$0.60
4	\$4.80	\$2.00	\$2.80	\$0.50	\$0.70	\$1.20	\$0.40
5	\$5.20	\$2.00	\$3.20	\$0.40	\$0.64	\$1.04	\$0.40
6	\$5.80	\$2.00	\$3.80	\$0.33	\$0.63	\$0.97	\$0.60
7	\$6.60	\$2.00	\$4.60	\$0.29	\$0.66	\$0.94	\$0.80
8	\$7.60	\$2.00	\$5.60	\$0.25	\$0.70	\$0.95	\$1.00
9	\$8.80	\$2.00	\$6.80	\$0.22	\$0.76	\$0.98	\$1.20
10	\$10.20	\$2.00	\$8.20	\$0.20	\$0.82	\$1.02	\$1.40
11	\$11.80	\$2.00	\$9.80	\$0.18	\$0.89	\$1.07	\$1.60
12	\$13.60	\$2.00	\$11.60	\$0.17	\$0.97	\$1.13	\$1.80
13	\$15.60	\$2.00	\$13.60	\$0.15	\$1.05	\$1.20	\$2.00
14	\$17.80	\$2.00	\$15.80	\$0.14	\$1.13	\$1.27	\$2.20

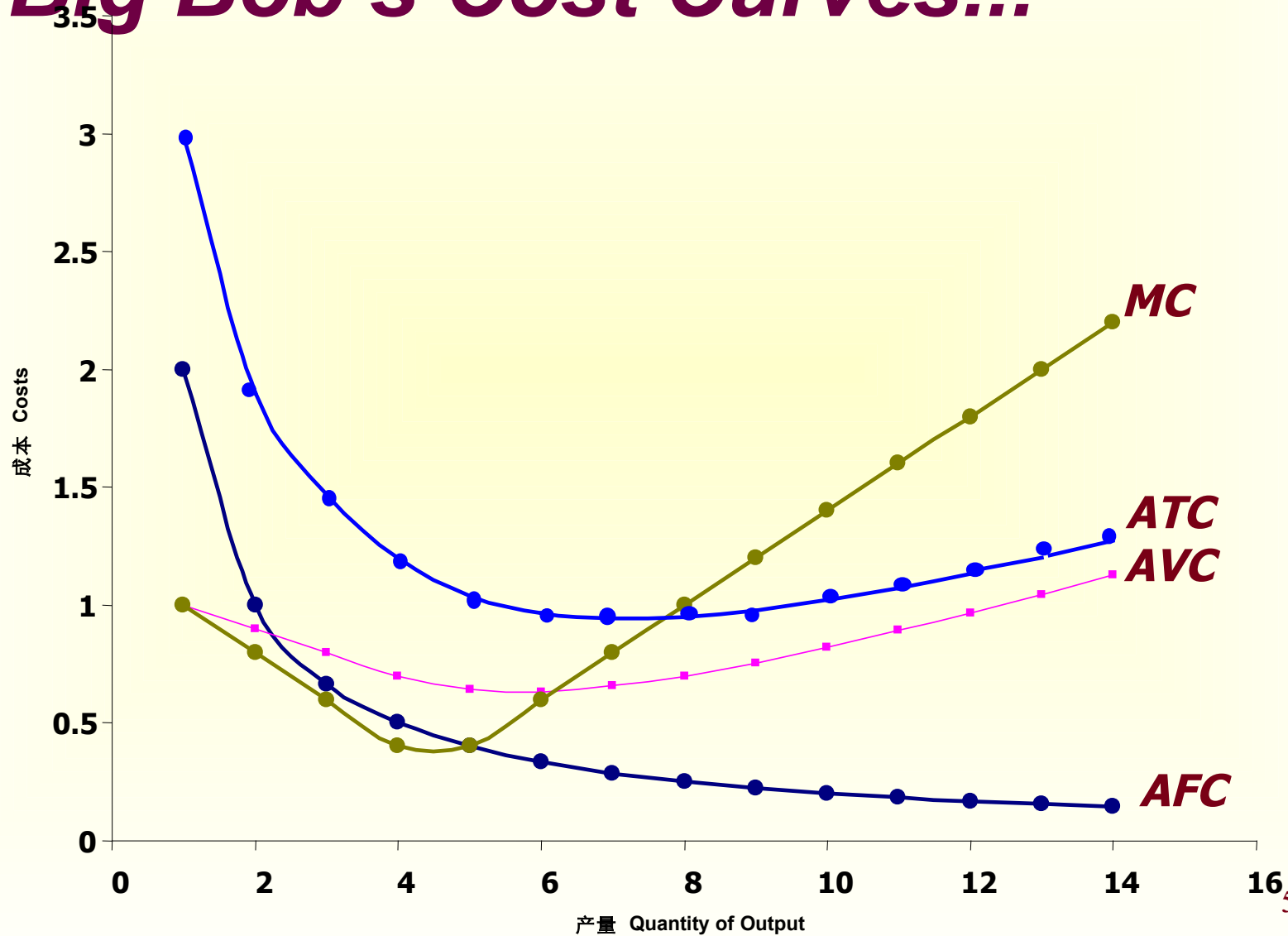
# 大鲍勃的成本曲线

## Big Bob's Cost Curves...



# 大鲍勃的成本曲线

## Big Bob's Cost Curves...



# 成本曲线的三个重要性质

## Three Important Properties of Cost Curves

✎ 边际成本随产量增加最终会上升。  
Marginal cost eventually rises with the quantity of output.

✎ 平均总成本曲线为 U 形。  
The average-total-cost curve is U-shaped.

✎ 边际成本曲线与平均总成本曲线相交在平均总成本的最小值处。  
The marginal-cost curve crosses the average-total-cost curve at the minimum of average total cost.

# 长期成本

## Costs in the Long Run

对于许多企业来说，总成本如何在固定和可变成本之间进行分解，取决于所考虑问题的时间范围。

For many firms, the division of total costs between fixed and variable costs depends on the time horizon being considered.

在短期内，某些成本是固定不变的。

In the short run some costs are fixed.

在长期内，固定成本变成可变成本。

In the long run fixed costs become variable costs.

# 长期成本

## Costs in the Long Run

因为许多成本在短期内是固定不变的，而在长期内是可以改变的，企业的长期成本曲线就有别于它的短期成本曲线。

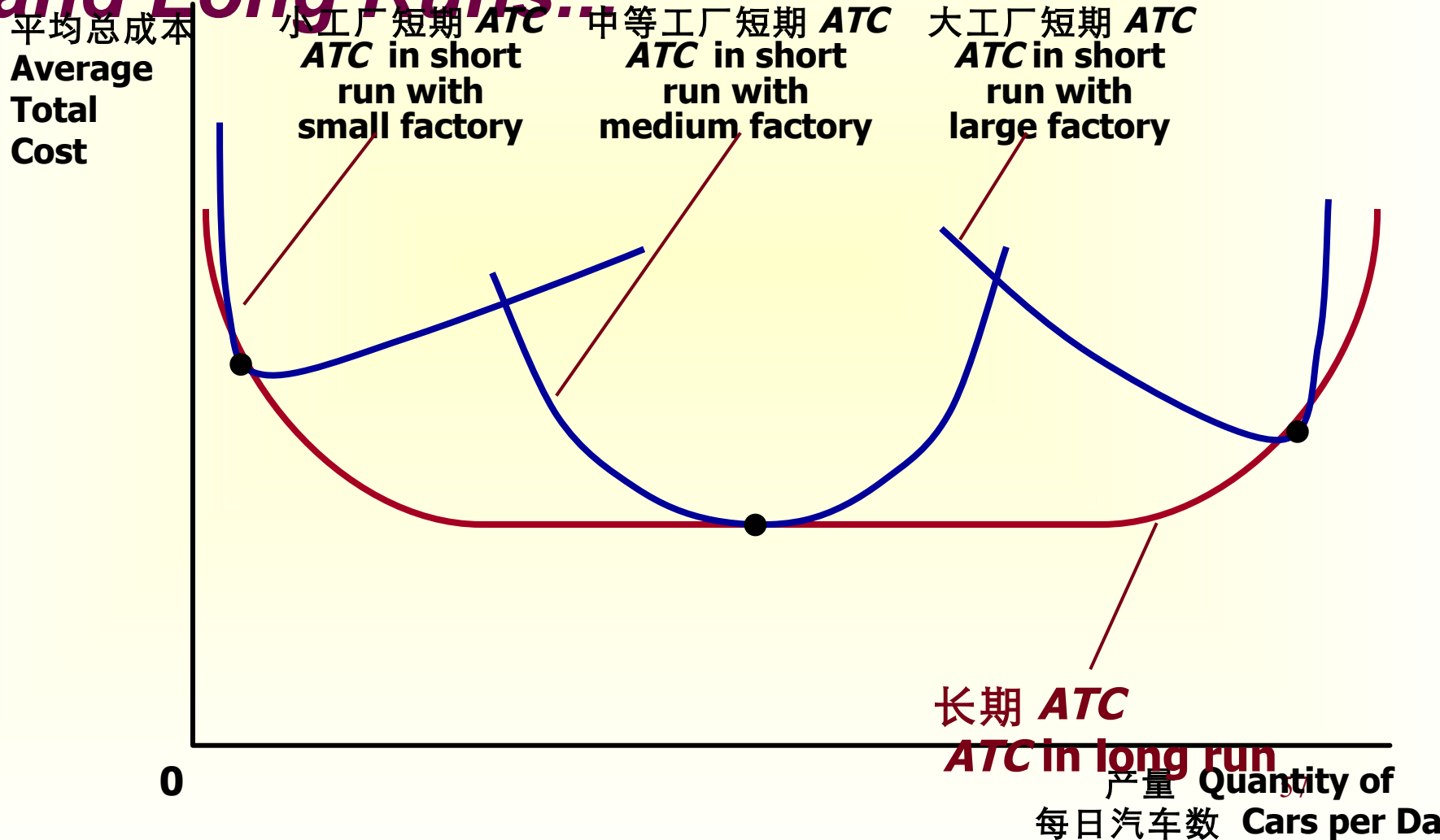
Because many costs are fixed in the short run but variable in the long run, a firm's long-run cost curves differ from its short-run cost

curves



# 短期和长期的平均总成本

## Average Total Cost in the Short and Long Runs...



# 短期和长期的平均总成本

## Average Total Cost in the Short and Long Runs

所有短期曲线在长期成本曲线线上或以上。  
All the short-run curve lie on or above the long-run curve.

长期平均总成本曲线是比短期平均总成本曲线扁平得多的 U 形曲线。

The long-run ATC curve is a much flatter U-shape than the short-run ATC curve.

企业在长期中有更大的灵活性。

Firms have greater flexibility in the long run.

# 规模经济与规模不经济

## Economies and Diseconomies of Scale

ㄱ 规模经济发生在长期平均总成本随产量增加而下降时。

**Economies of scale** occur when long-run average total cost declines as output increases.

ㄱ 规模不经济发生在长期平均总成本随产量增加而上升时。

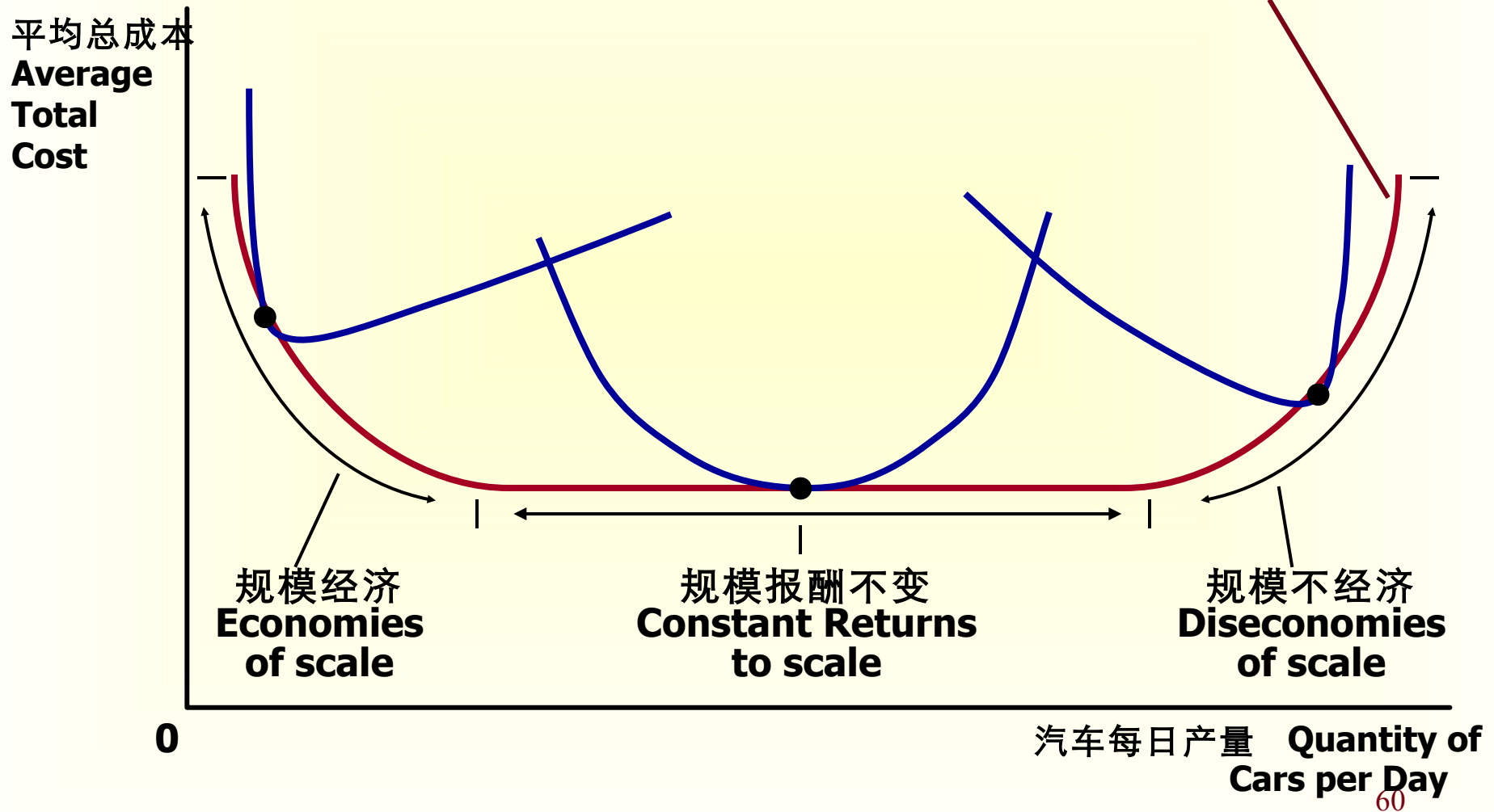
**Diseconomies of scale** occur when long-run average total cost rises as output increases.

ㄱ 规模报酬不变发生在长期平均总成本不随产量增加而改变时。

**Constant returns to scale** occur when long-run average total cost does not vary as output increases.

# 规模经济与规模不经济

## Economies and Diseconomies of Scale



# 总结

## Summary

企业的目标是追求最大利润，利润等于总收益减去总成本。

The goal of firms is to maximize profit, which equals total revenue minus total cost.

当分析企业的行为时，重要的是要包括生产的所有机会成本。

When analyzing a firm's behavior, it is important to include all the opportunity costs of production.

某些机会成本是显性的，但其他机会成本是隐性的。

Some opportunity costs are explicit while other opportunity costs are implicit.

# 总结

## Summary

企业的成本反映了它的生产过程。

A firm's costs reflect its production process.

一个典型企业的生产函数随投入量的增加变得愈发平坦，表现出边际产量递减的性质。

A typical firm's production function gets flatter as the quantity of input increases, displaying the property of diminishing marginal product.

一个企业的总成本被分解为固定和可变成本。固定成本不随产量改变；可变成本随产量改变。

A firm's total costs are divided between fixed and variable costs. Fixed costs

don't vary with quantities produced; variable

# 总结

## Summary

平均总成本是总成本除以产量。

Average total cost is total cost divided by the quantity of output.

边际成本是产量增加一单位时总成本上升的数量。

Marginal cost is the amount by which total cost would rise if output were increased by one unit.

边际成本总是随产量上升。

The marginal cost always rises with the quantity of output.

# 总结

## Summary

平均总成本是 U 形的。

The average-total-cost curve is U-shaped.

边际成本曲线总是和平均总成本曲线相交在 ATC 的最低点。

The marginal-cost curve always crosses the average-total-cost curve at the minimum of ATC.

企业的成本通常依赖于所考虑的时间范围。

A firm's costs often depend on the time horizon being considered.