A Lecture Presentation in PowerPoint
to Accompany

Principles of Economics

Second Edition

by

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Ten Principles of Economics

Chapter 1

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Economy. . .

. . . The word economy comes from a Greek word for “one who manages a household.”

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A household and an economy face many decisions:

- Who will work?
- What goods and how many of them should be produced?
- What resources should be used in production?
- At what price should the goods be sold?

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Society and Scarce Resources:

The management of society's resources is important because resources are scarce.

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Scarcity . . .

. . . means that society has limited resources and therefore cannot produce all the goods and services people wish to have.

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Economics

Economics is the study of how society manages its scarce resources.

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Economists study. . .

- *How people make decisions.*
- *How people interact with each other.*
- *The forces and trends that affect the economy as a whole.*

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Ten Principles of Economics

How People Make Decisions

1. People face tradeoffs.
2. The cost of something is what you give up to get it.
3. Rational people think at the margin.
4. People respond to incentives.

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Ten Principles of Economics

How People Interact

5. Trade can make everyone better off.
6. Markets are usually a good way to organize economic activity.
7. Governments can sometimes improve economic outcomes.

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Ten Principles of Economics

How the Economy as a Whole Works

8. The standard of living depends on a country's production.
9. Prices rise when the government prints too much money.
10. Society faces a short-run tradeoff between inflation and unemployment.

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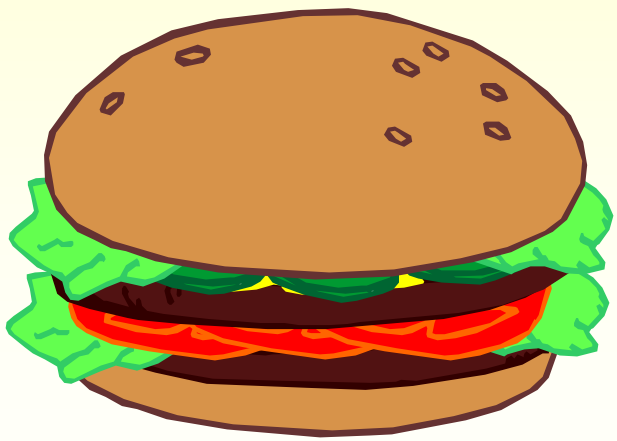
1. People face tradeoffs.

“There is no such thing as a free lunch!”



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1. People face tradeoffs.

To get one thing, we usually have to give up another thing.

- **Guns v. butter**
- **Food v. clothing**
- **Leisure time v. work**
- **Efficiency v. equity**

Making decisions requires trading off one goal against another.

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1. People face tradeoffs.

Efficiency v. Equity

- **Efficiency** means society gets the most that it can from its scarce resources.
- **Equity** means the benefits of those resources are distributed fairly among the members of society.

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2. The cost of something is what you give up to get it.

Decisions require comparing costs and benefits of alternatives.

- Whether to go to college or to work?
- Whether to study or go out on a date?
- Whether to go to class or sleep in?

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2. The cost of something is what you give up to get it.

The opportunity cost of an item is what you give up to obtain that item.

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3. Rational people think at the margin.

Marginal changes are small, incremental adjustments to an existing plan of action.

People make decisions by comparing costs and benefits *at the margin*.

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4. People respond to incentives.

- **Marginal changes in costs or benefits motivate people to respond.**
- **The decision to choose one alternative over another occurs when that alternative's marginal benefits *exceed* its marginal costs!**

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4. People respond to incentives.

LA Laker basketball star Kobe Bryant chose to skip college and go straight to the NBA from high school when offered a $10 million contract.

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5. Trade can make everyone better off.

- People gain from their ability to trade with one another.
- Competition results in gains from trading.
- Trade allows people to specialize in what they do best.

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6. Markets are usually a good way to organize economic activity.

- In a **market economy**, households decide what to buy and who to work for.
- Firms decide who to hire and what to produce.

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6. Markets are usually a good way to organize economic activity.

Adam Smith made the observation that households and firms interacting in markets act as if guided by an "invisible hand."

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6. Markets are usually a good way to organize economic activity.

- Because households and firms look at prices when deciding what to buy and sell, they unknowingly take into account the social costs of their actions.
- As a result, prices guide decision makers to reach outcomes that tend to maximize the welfare of society as a whole.

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7. Governments can sometimes improve market outcomes.

When the market fails (breaks down) government can intervene to promote efficiency and equity.

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7. Governments can sometimes improve market outcomes.

Market failure occurs when the market fails to allocate resources efficiently.

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7. Governments can sometimes improve market outcomes.

Market failure may be caused by an externality, which is the impact of one person or firm's actions on the well-being of a bystander.

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7. Governments can sometimes improve market outcomes.

Market failure may also be caused by market power, which is the ability of a single person or firm to unduly influence market prices.

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8. The standard of living depends on a country's production.

Standard of living may be measured in different ways:

- By comparing personal incomes.
- By comparing the total market value of a nation's production.

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8. The standard of living depends on a country's production.

Almost all variations in living standards are explained by differences in countries' productivities.

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8. The standard of living depends on a country's production.

Productivity is the amount of goods and services produced from each hour of a worker's time.

Higher productivity ⇨ Higher standard of living

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9. Prices rise when the government prints too much money.

Inflation is an increase in the overall level of prices in the economy.

- One cause of inflation is the growth in the quantity of money.
- When the government creates large quantities of money, the value of the money falls.

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10. Society faces a short-run tradeoff between inflation and unemployment.

The Phillips Curve illustrates the tradeoff between inflation and unemployment:

⇩Inflation ⇨ ⇧Unemployment

It's a short-run tradeoff!

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Summary

- When individuals make decisions, they face tradeoffs.
- Rational people make decisions by comparing marginal costs and marginal benefits.

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Summary

- People can benefit by trading with each other.
- Markets are usually a good way of coordinating trades.
- Government can potentially improve market outcomes.

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Summary

- A country's productivity determines its living standards.
- Society faces a short-run tradeoff between inflation and unemployment.

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Thinking Like an Economist

Chapter 2

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Every field of study has its own terminology

Mathematics

integrals

axioms

vector spaces

Psychology

ego

id

cognitive dissonance

Law

torts

Promissory estoppel

venues

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Every field of study has its own terminology

Economics

Supply

Opportunity cost

Elasticity

Comparative advantage

Consumer Surplus

Demand

Deadweight loss

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Economics trains you to. . . .

- Think in terms of alternatives.
- Evaluate the cost of individual and social choices.
- Examine and understand how certain events and issues are related.

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The Economist as a Scientist

The economic way of thinking . . .

- **Involves thinking analytically and objectively.**
- **Makes use of the scientific method.**

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The Scientific Method

- Uses abstract models to help explain how a complex, real world operates.
- Develops theories, collects, and analyzes data to prove the theories.

Observation, Theory and More Observation!

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The Role of Assumptions

- Economists make assumptions in order to make the world easier to understand.
- The art in scientific thinking is deciding which assumptions to make.
- Economists use different assumptions to answer different questions.

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The Economic Way of Thinking

- **Includes developing *abstract models* from theories and the analysis of the models.**
- **Uses two approaches:**
  - ***Descriptive*** (reporting facts, etc.)
  - ***Analytical*** (abstract reasoning)

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Economic Models

- Economists use models to simplify reality in order to improve our understanding of the world
- Two of the most basic economic models include:
  - *The Circular Flow Model*
  - *The Production Possibilities Frontier*

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The Circular-Flow Model

The circular-flow model is a simple way to visually show the economic transactions that occur between households and firms in the economy.

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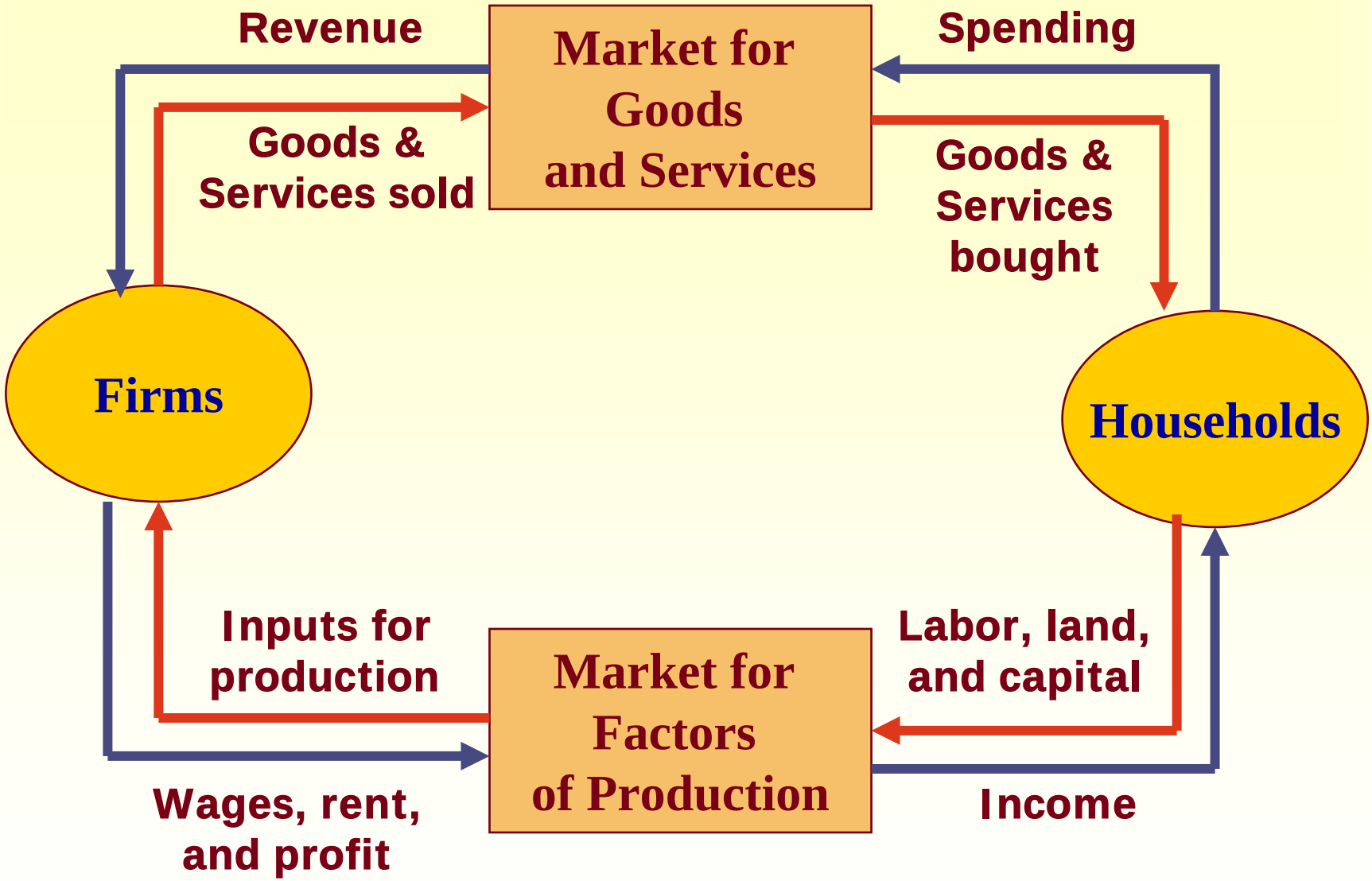
The Circular-Flow Diagram



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The Circular-Flow Diagram

Firms

- Produce and sell goods and services
- Hire and use factors of production

Households

- Buy and consume goods and services
- Own and sell factors of production

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The Circular-Flow Diagram

Markets for Goods & Services

- Firms sell
- Households buy

Markets for Factors of Production

- Households sell
- Firms buy

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The Circular-Flow Diagram

Factors of Production

- Inputs used to produce goods and services
- Land, labor, and capital

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The Production Possibilities Frontier

The production possibilities frontier is a graph showing the various combinations of output that the economy can possibly produce given the available factors of production and technology.

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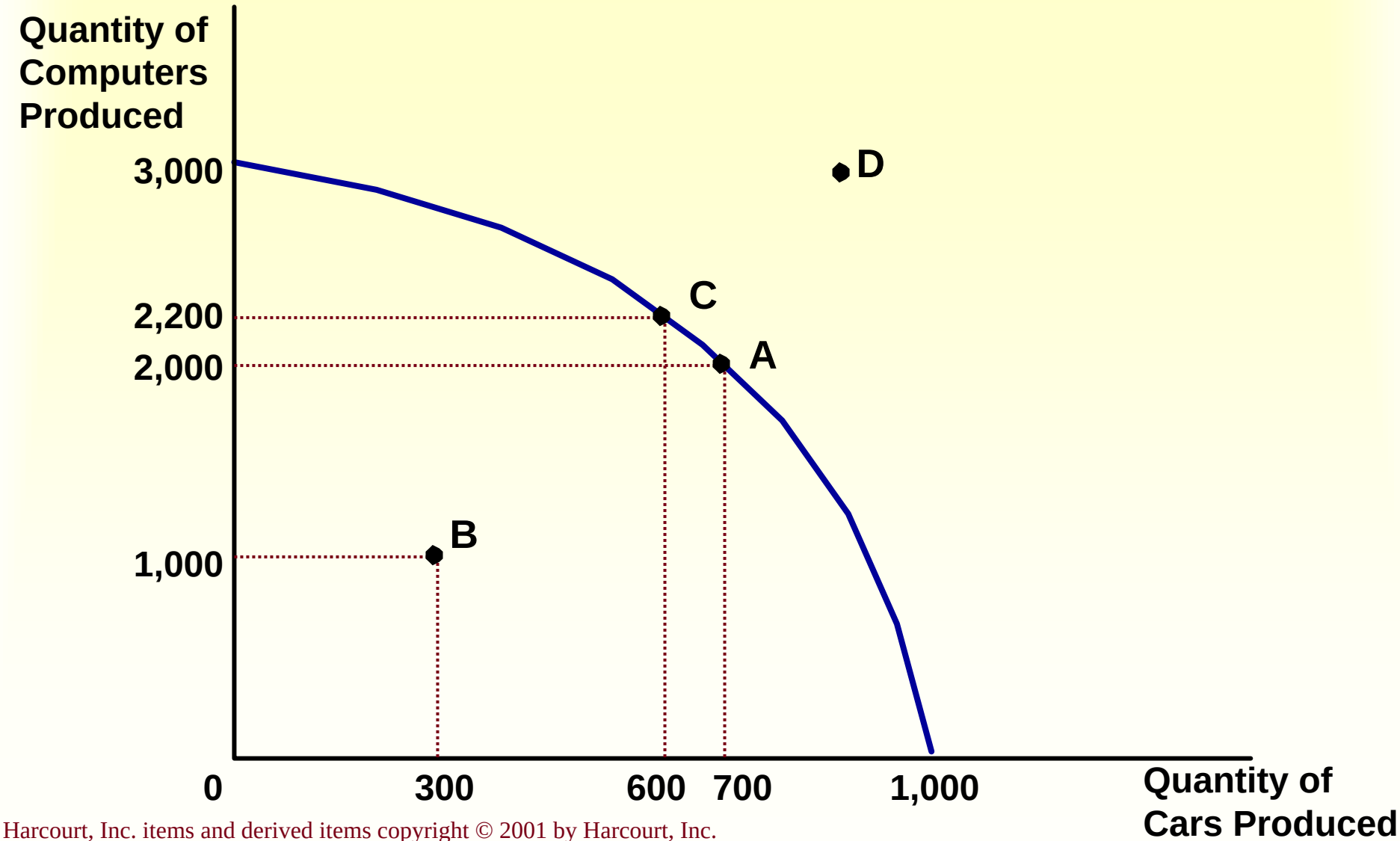
The Production Possibilities Frontier



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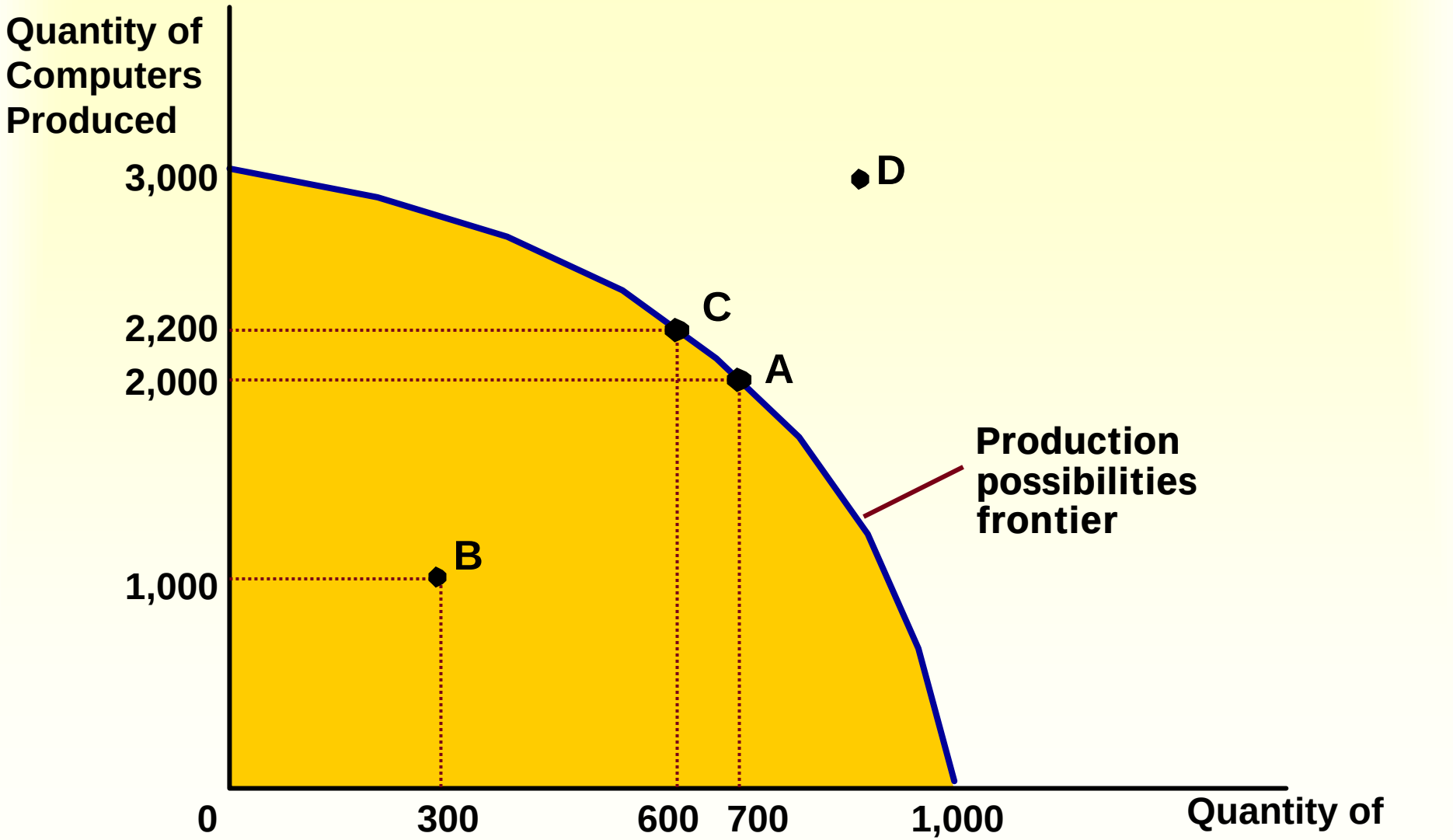
The Production Possibilities Frontier



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Concepts Illustrated by the Production Possibilities Frontier

- Efficiency
- Tradeoffs
- Opportunity Cost
- Economic Growth

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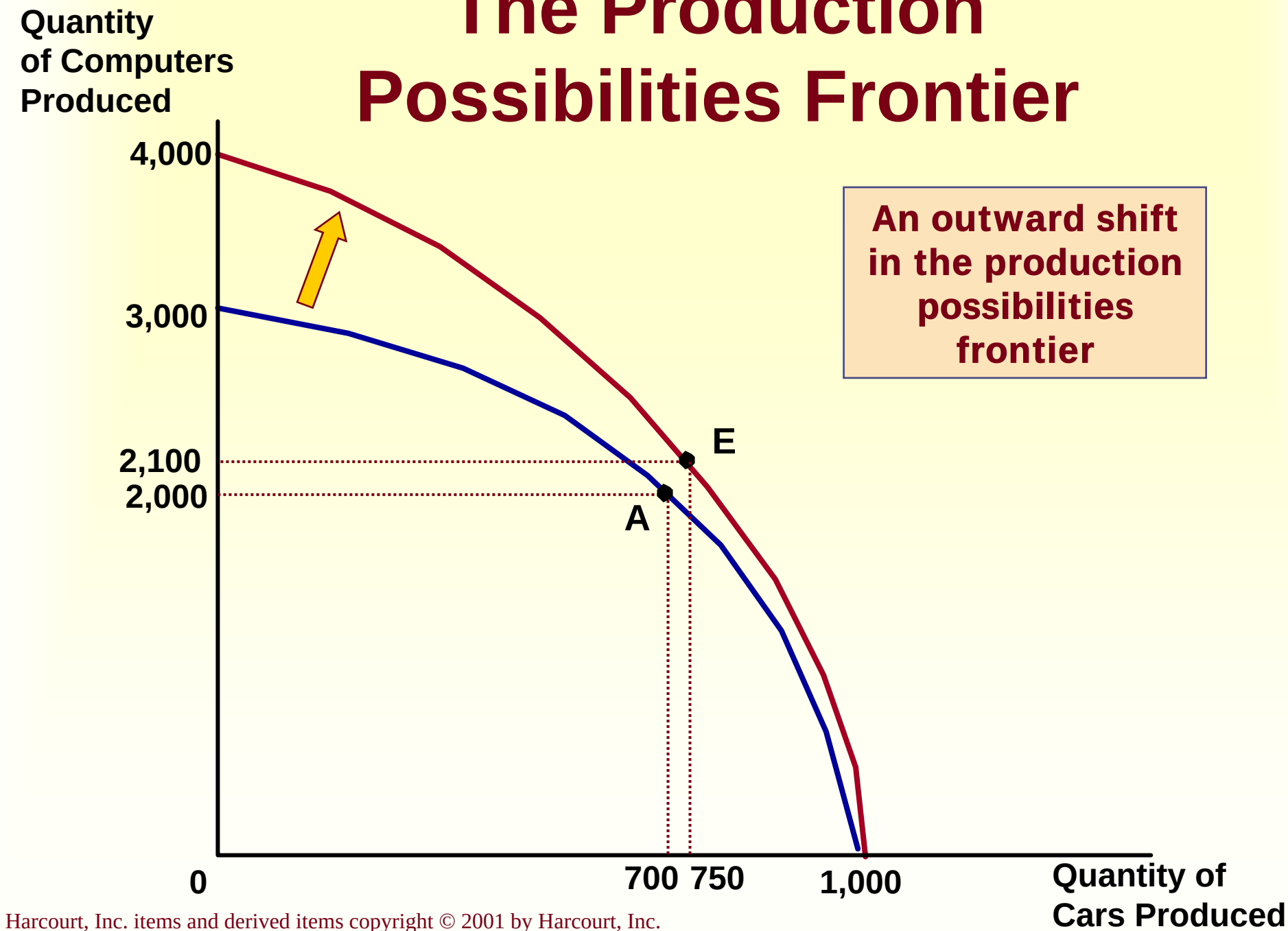
The Production Possibilities Frontier



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Microeconomics and Macroeconomics

- **Microeconomics** focuses on the individual parts of the economy.
  - How households and firms make decisions and how they interact in specific markets
- **Macroeconomics** looks at the economy as a whole.
  - How the markets, as a whole, interact at the national level.

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Two Roles of Economists

- When they are trying to explain the world, they are *scientists.*
- When they are trying to change the world, they are *policymakers.*

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Positive versus Normative Analysis

- **Positive statements** are statements that describe the world as it is.
  - Called *descriptive* analysis
- **Normative statements** are statements about how the world should be.
  - Called *prescriptive* analysis

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Positive or Normative Statements?

?

An increase in the minimum wage will cause a decrease in employment among the least-skilled.

?

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Positive or Normative Statements?

?

Higher federal budget deficits will cause interest rates to increase.

?

?

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Positive or Normative Statements?

?

?

The income gains from a higher minimum wage are worth more than any slight reductions in employment.

?

?

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Positive or Normative Statements?

? ?

State governments should be allowed to collect from tobacco companies the costs of treating smoking-related illnesses among the poor.

?

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Economists in Washington . . .

. . . serve as advisers in the policymaking process of the three branches of government:

- Legislative
- Executive
- Judicial

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Why Economists Disagree

- They may disagree on theories about how the world works.
- They may hold different values and, thus, different normative views.

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Examples of What Most Economists Agree On

- A ceiling on rents reduces the quantity and quality of housing available.
- Tariffs and import quotas usually reduce general economic welfare.

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Summary

- In order to address subjects with objectivity, economics makes use of the scientific method.
- The field of economics is divided into two subfields: microeconomics and macroeconomics.

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Summary

- Economics relies on both positive and normative analysis. Positive statements assert how the world "is" while normative statements assert how the world "should be."
- Economists may offer conflicting advice due to differences in scientific judgments or to differences in values.

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Graphical Review

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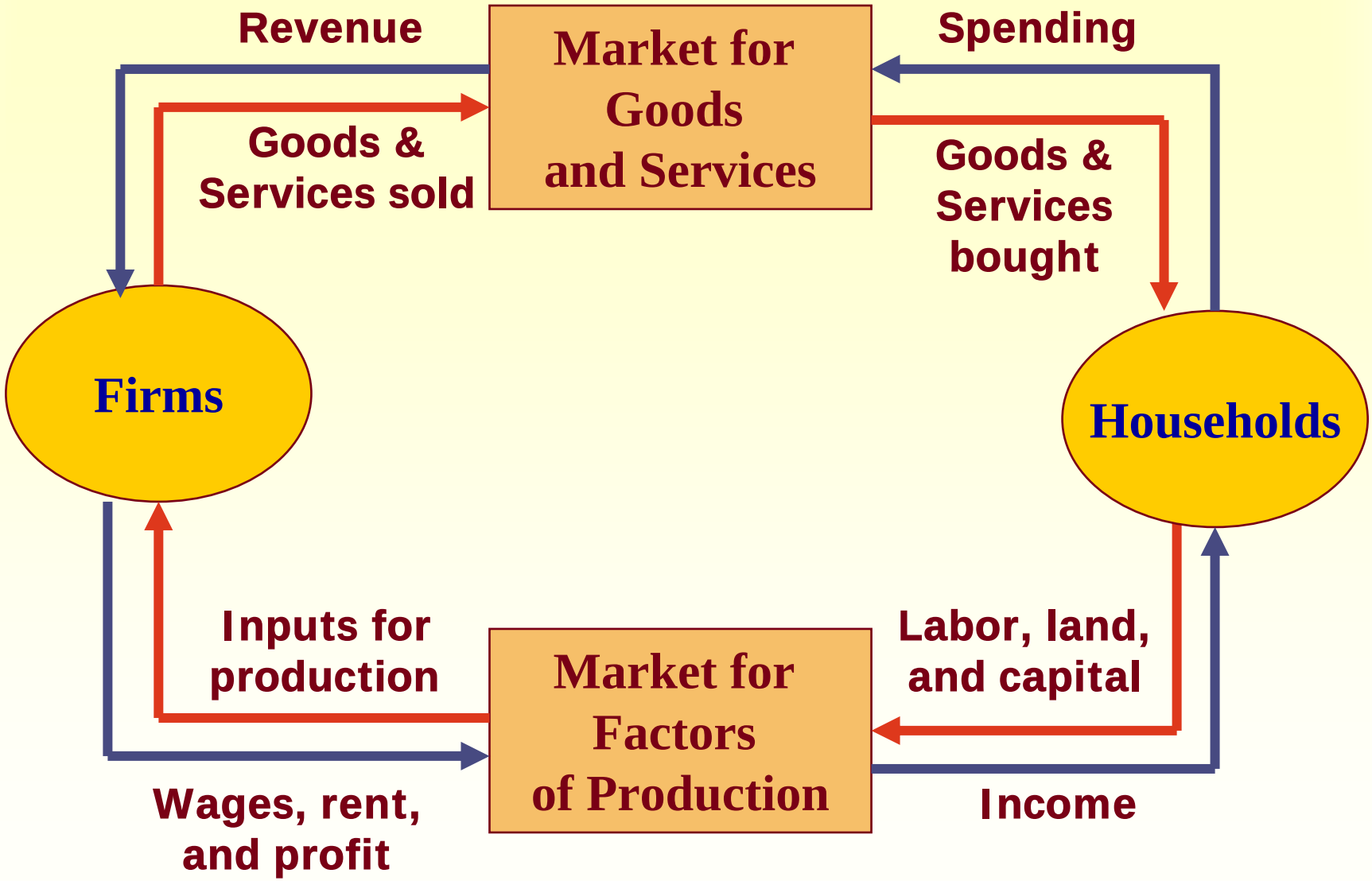
The Circular-Flow Diagram



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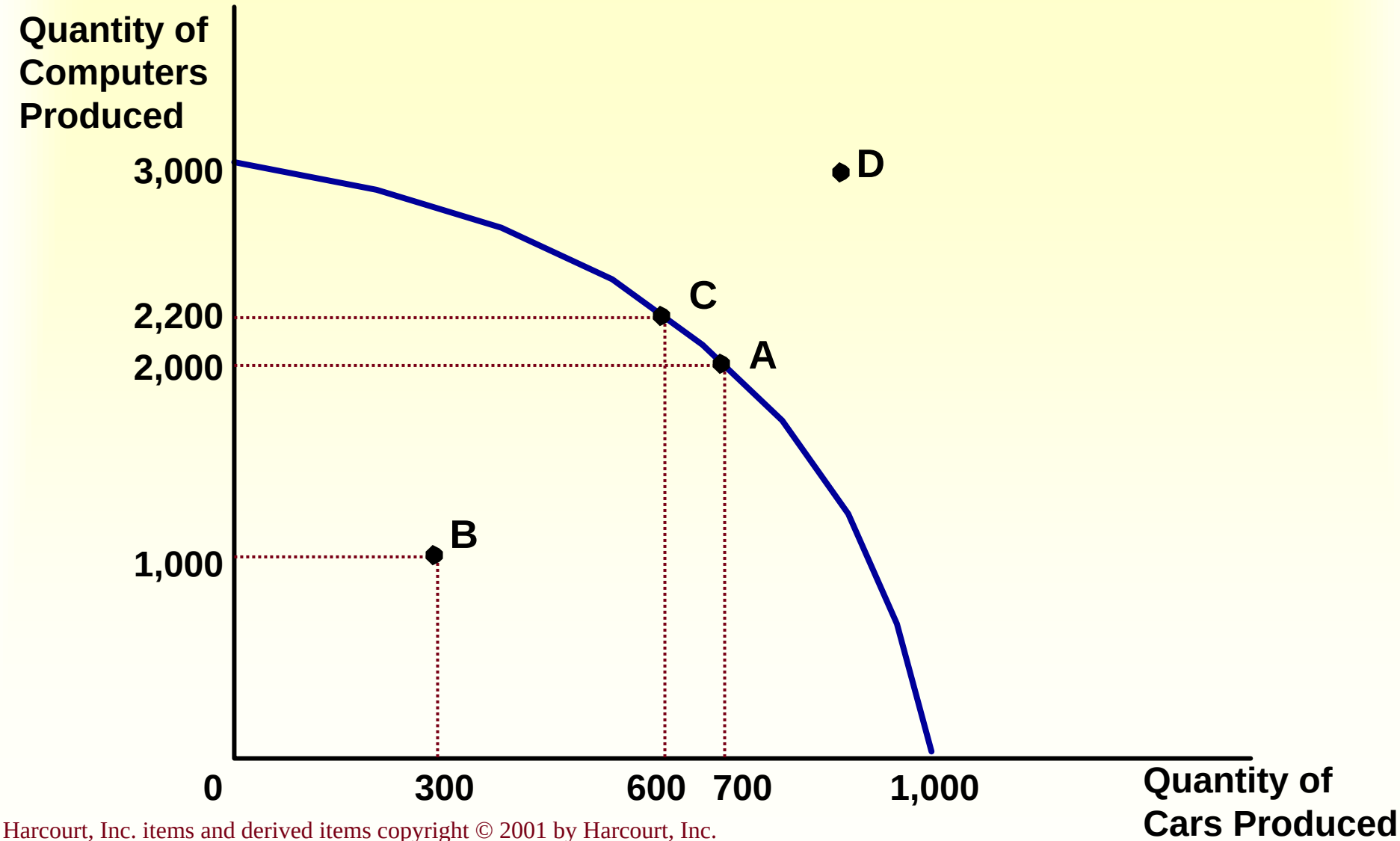
The Production Possibilities Frontier



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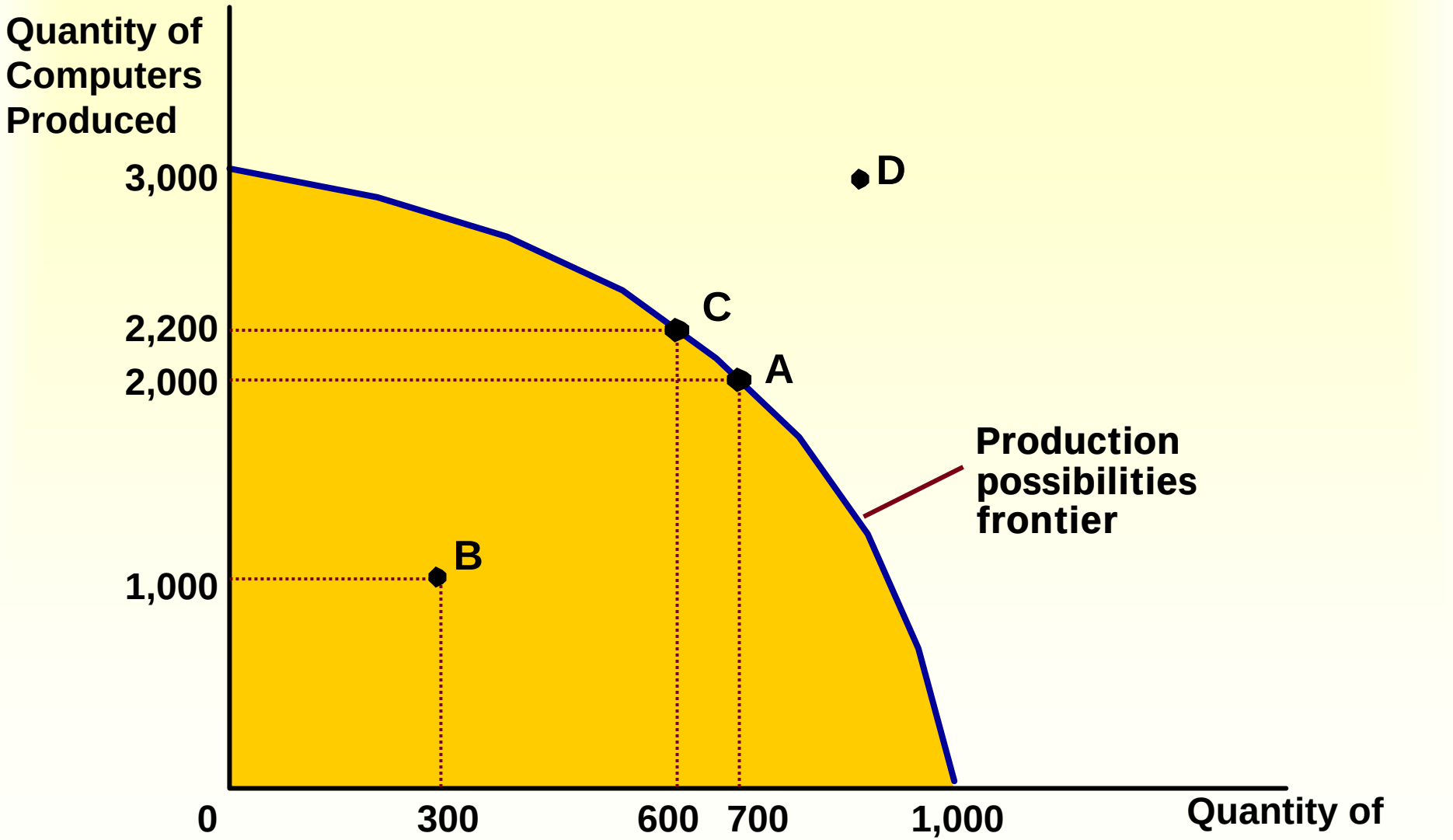
The Production Possibilities Frontier



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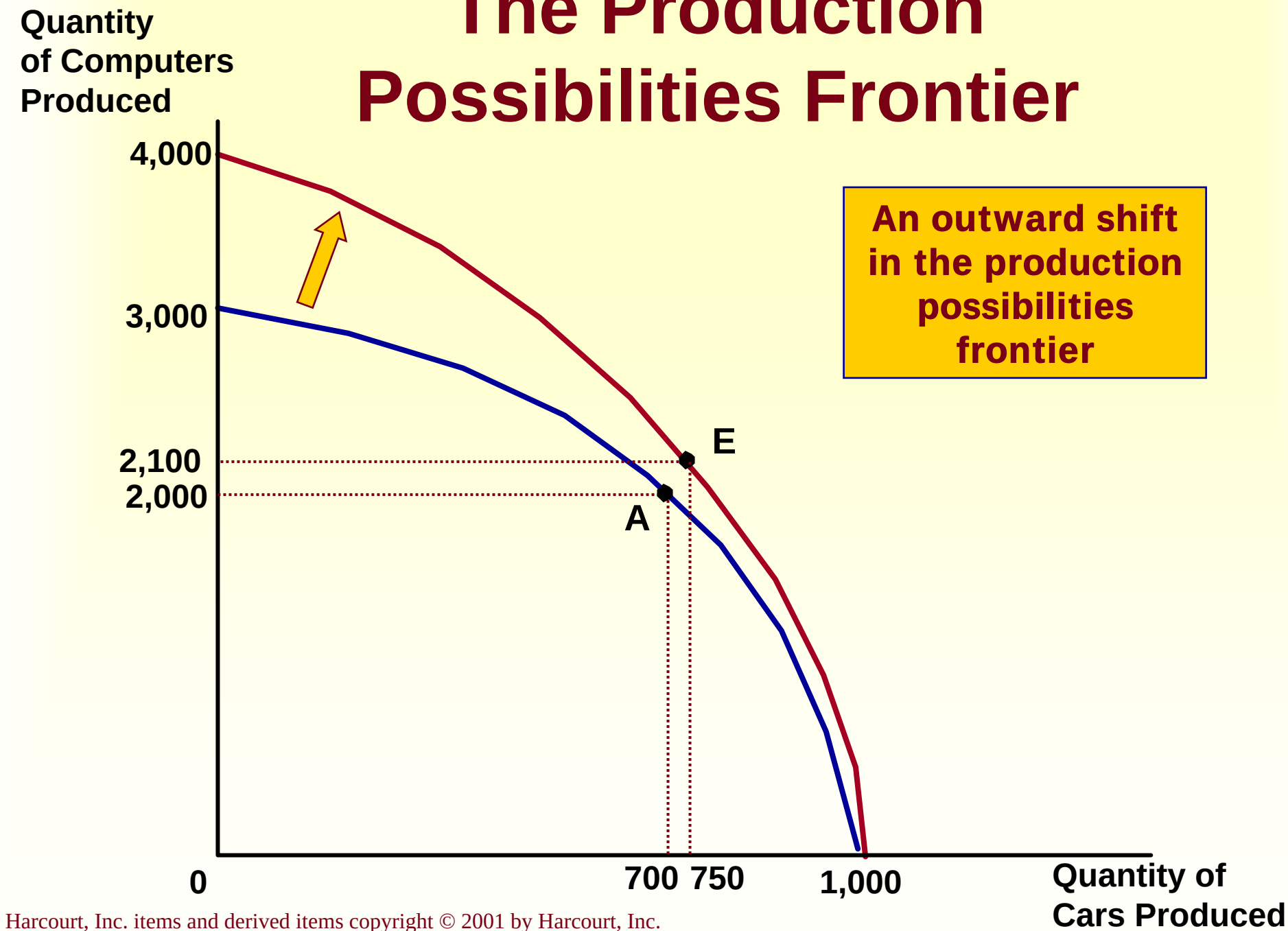
The Production Possibilities Frontier



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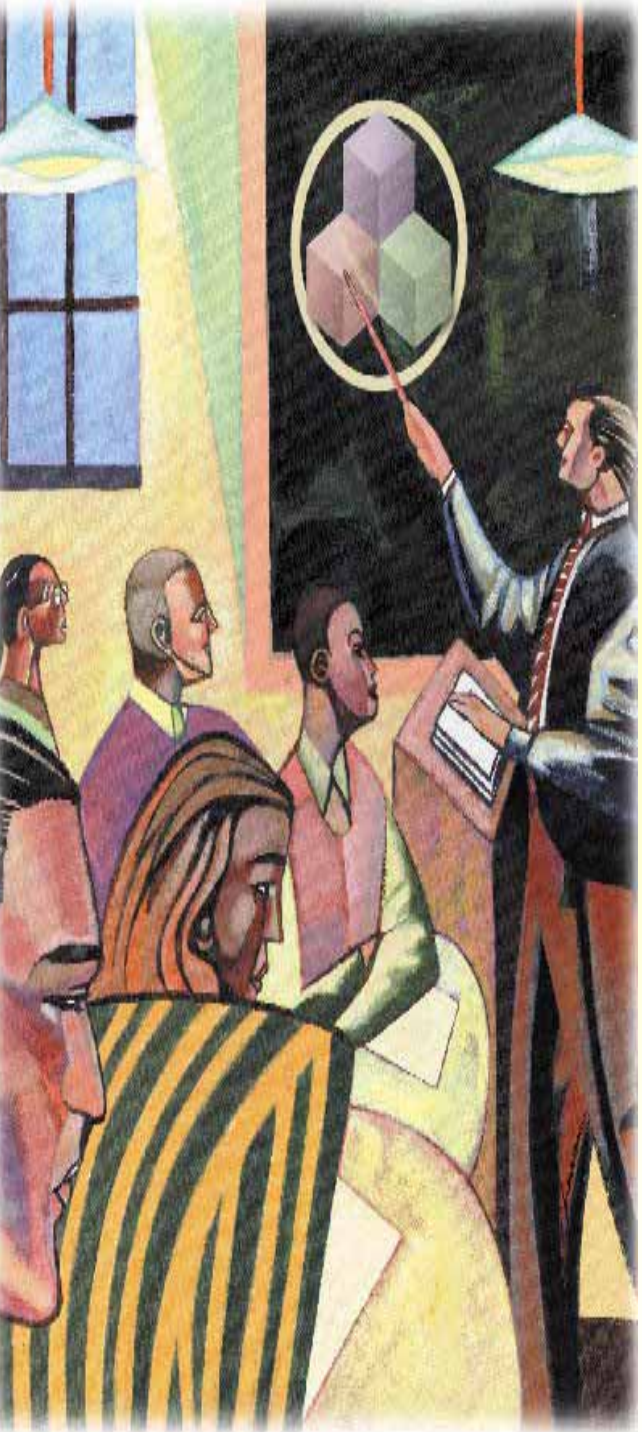

Interdependence and the Gains from Trade

Chapter 3

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Interdependence and Trade

Consider your typical day:

- **You wake up to an alarm clock made in Korea.**
- **You pour yourself some orange juice made from oranges grown in Florida.**
- **You put on some clothes made of cotton grown in Georgia and sewn in factories in Thailand.**
- **You watch the morning news broadcast from New York on your TV made in Japan.**
- **You drive to class in a car made of parts manufactured in a half-dozen different countries.**

…and you haven't been up for more than two hours yet!

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Interdependence and Trade

Remember, economics is the study of how societies produce and distribute goods in an attempt to satisfy the wants and needs of its members.

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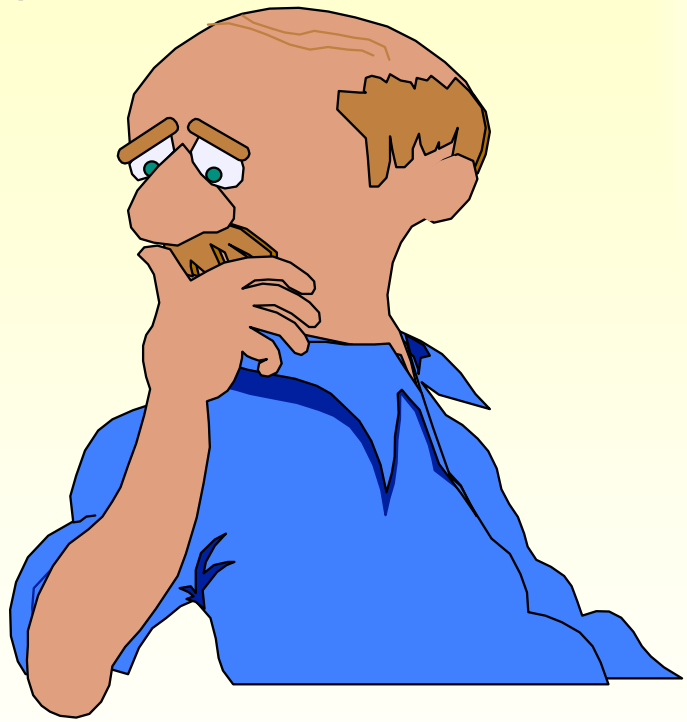
How do we satisfy our wants and needs in a global economy?

- We can be economically self-sufficient.
- We can specialize and trade with others, leading to economic interdependence.



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Interdependence and Trade

A general observation . . .

Individuals and nations rely on specialized production and exchange as a way to address problems caused by scarcity.

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Interdependence and Trade

But, this gives rise to two questions:

- **Why is interdependence the norm?**
- **What determines production and trade?**

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Why is interdependence the norm?

Interdependence occurs because people are better off when they specialize and trade with others.

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What determines the pattern of production and trade?

Patterns of production and trade are based upon differences in opportunity costs.

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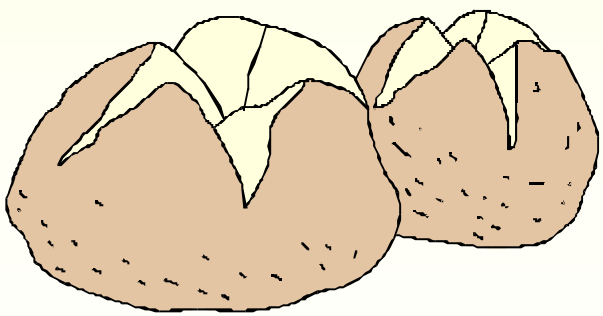
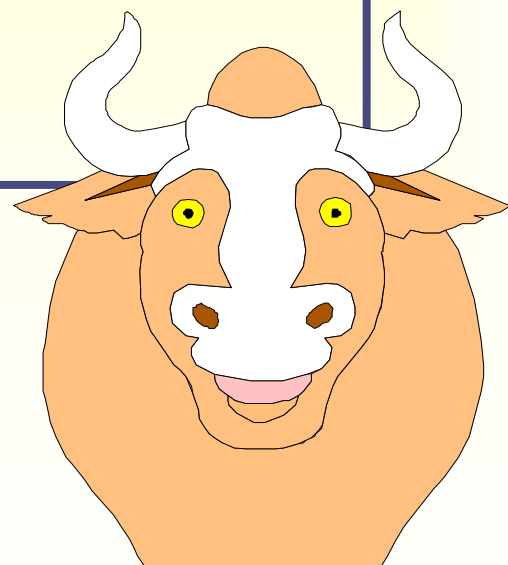
A Parable for the Modern Economy

- **Imagine . . .**
  - **…only two goods: potatoes and meat**
  - **…only two people: a potato farmer and a cattle rancher**
- **What should each produce?**
- **Why should they trade?**





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The Production Opportunities of the Farmer and the Rancher

	Hours Needed to Make 1 lb. of:		*Amount Produced in 40 Hours*	
	Meat	**Potatoes**	**Meat**	**Potatoes**
Farmer	20 hours/lb	10 hours/lb	2 lbs.	4 lbs.
Rancher	1 hours/lb	8 hours/lb.	40 lbs.	5 lbs.

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Self-Sufficiency

By ignoring each other:

- **Each consumes what they each produce.**
- **The production possibilities frontier is also the consumption possibilities frontier.**

Without trade, economic gains are diminished.

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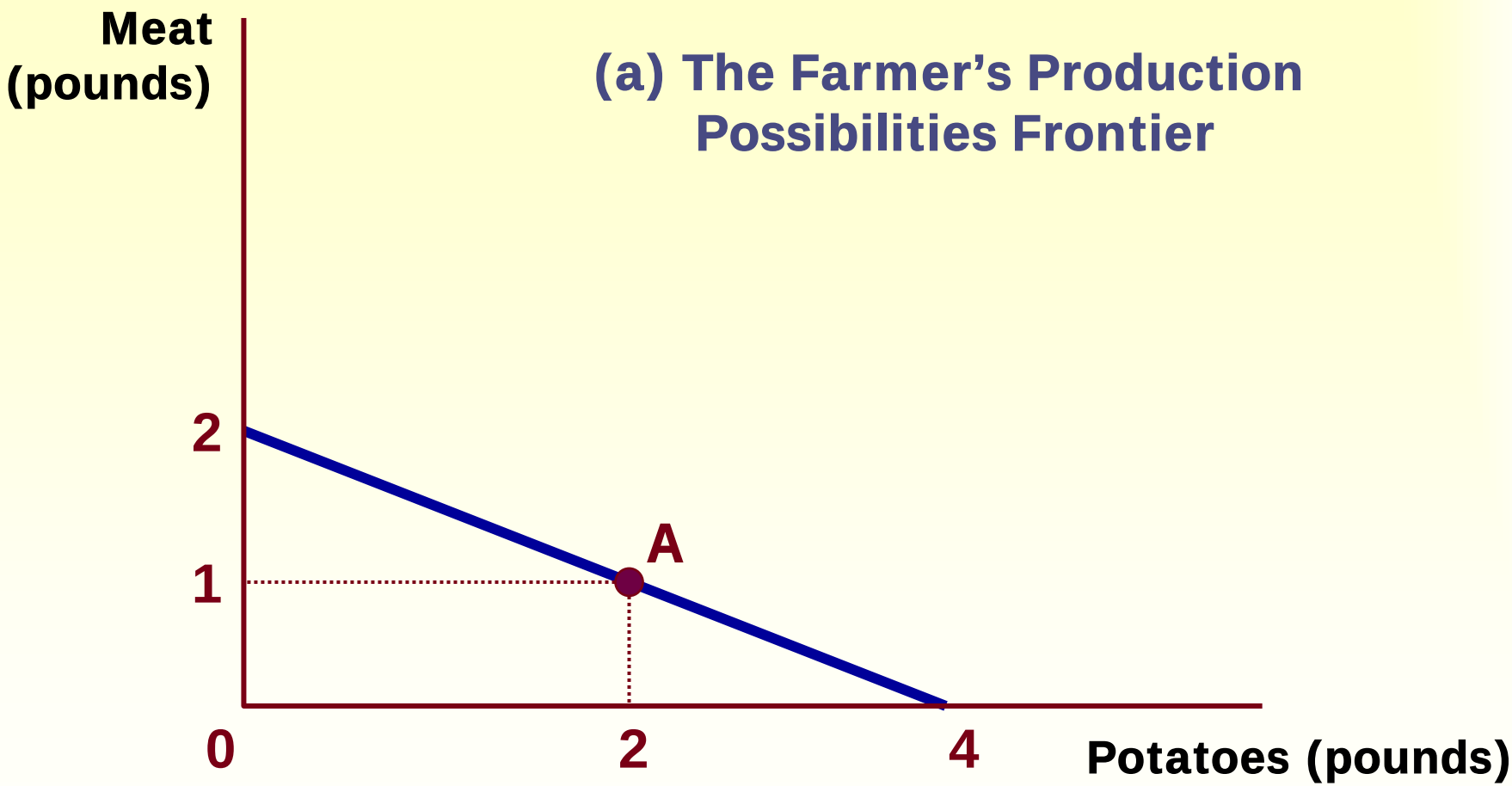
Production Possibilities Frontiers



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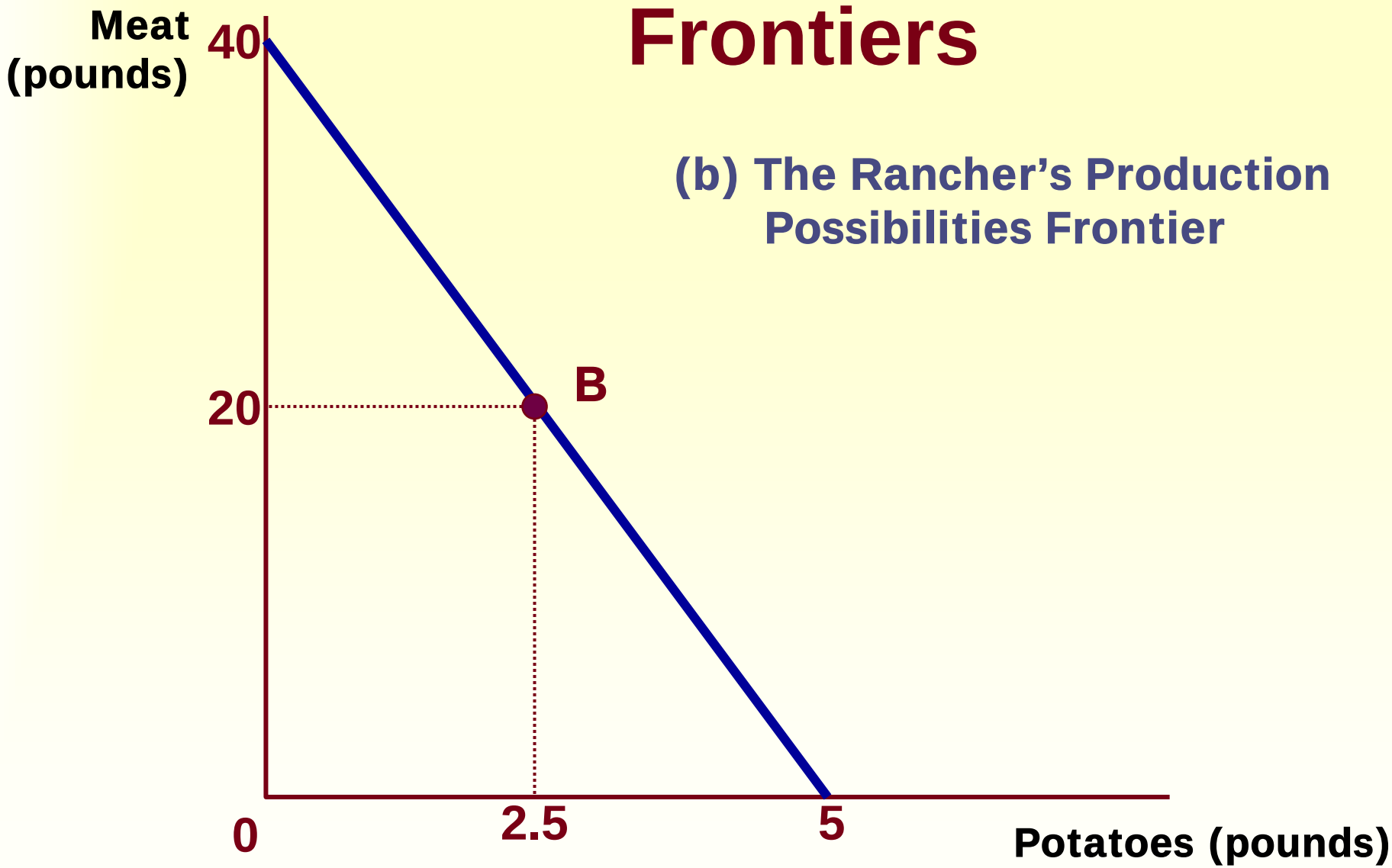
Production Possibilities Frontiers



(b) The Rancher's Production Possibilities Frontier

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The Farmer and the Rancher Specialize and Trade

Each would be better off if they specialized in producing the product they are more suited to produce, and then trade with each other.

- The farmer should produce potatoes.
- The rancher should produce meat.

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The Gains from Trade: A Summary

	The Outcome Without Trade:
	What They Produce and Consume
Farmer	1 lb meat (**A**) 2 lbs potatoes
Rancher	20 lbs meat (**B**) 2.5 lbs potatoes

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The Gains from Trade: A Summary

	The Outcome With Trade:		
	What They Produce	**What They Trade**	**What They Consume**
Farmer	0 lbs meat 4 lbs potatoes	Gets 3 lbs meat for 1 lb potatoes	3 lbs meat (**A***) 3 lbs potatoes
Rancher	24 lbs meat 2 lbs potatoes	Gives 3 lbs meat for 1 lb potatoes	21 lbs meat (**B***) 3 lbs potatoes

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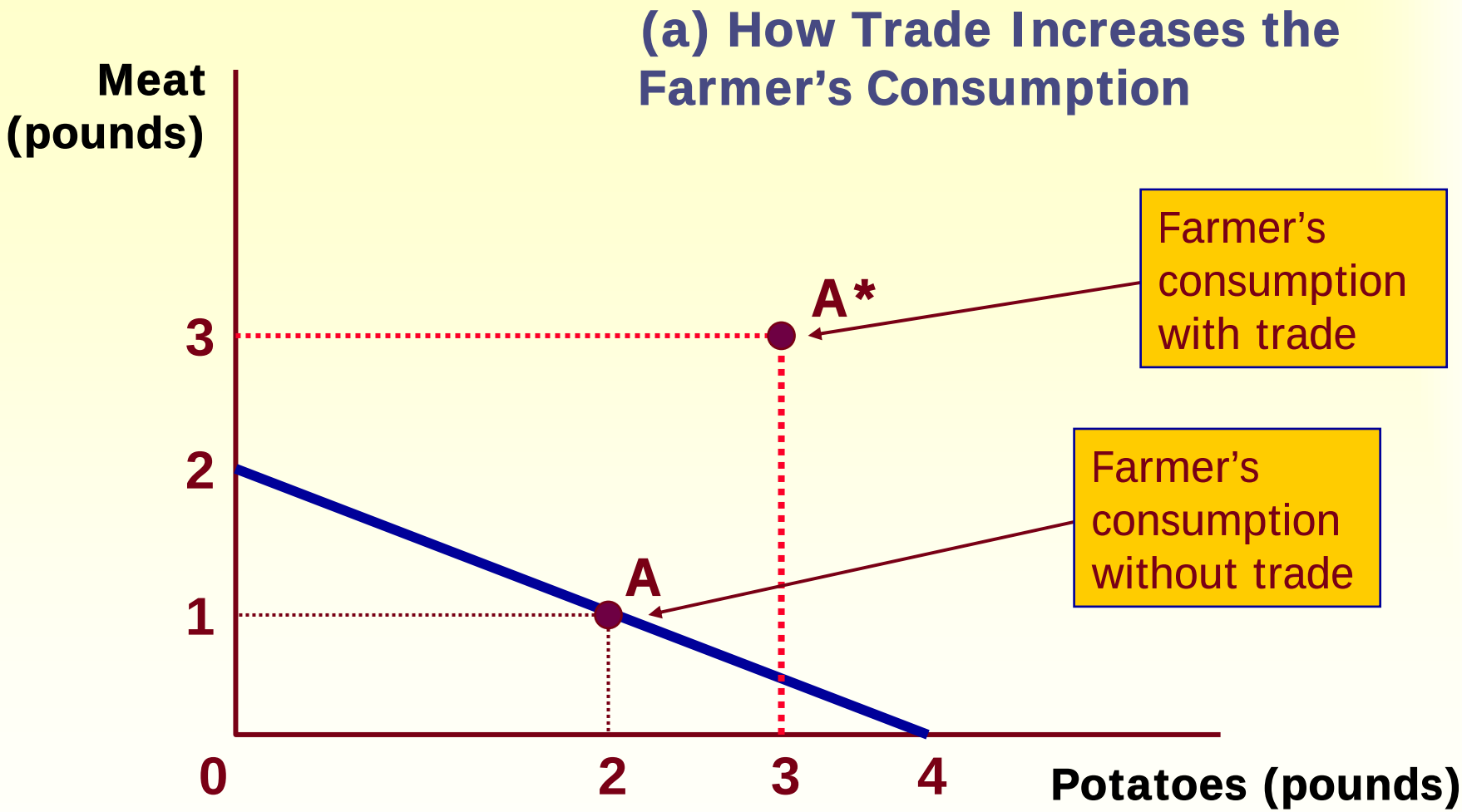
Trade Expands the Set of Consumption Possibilities



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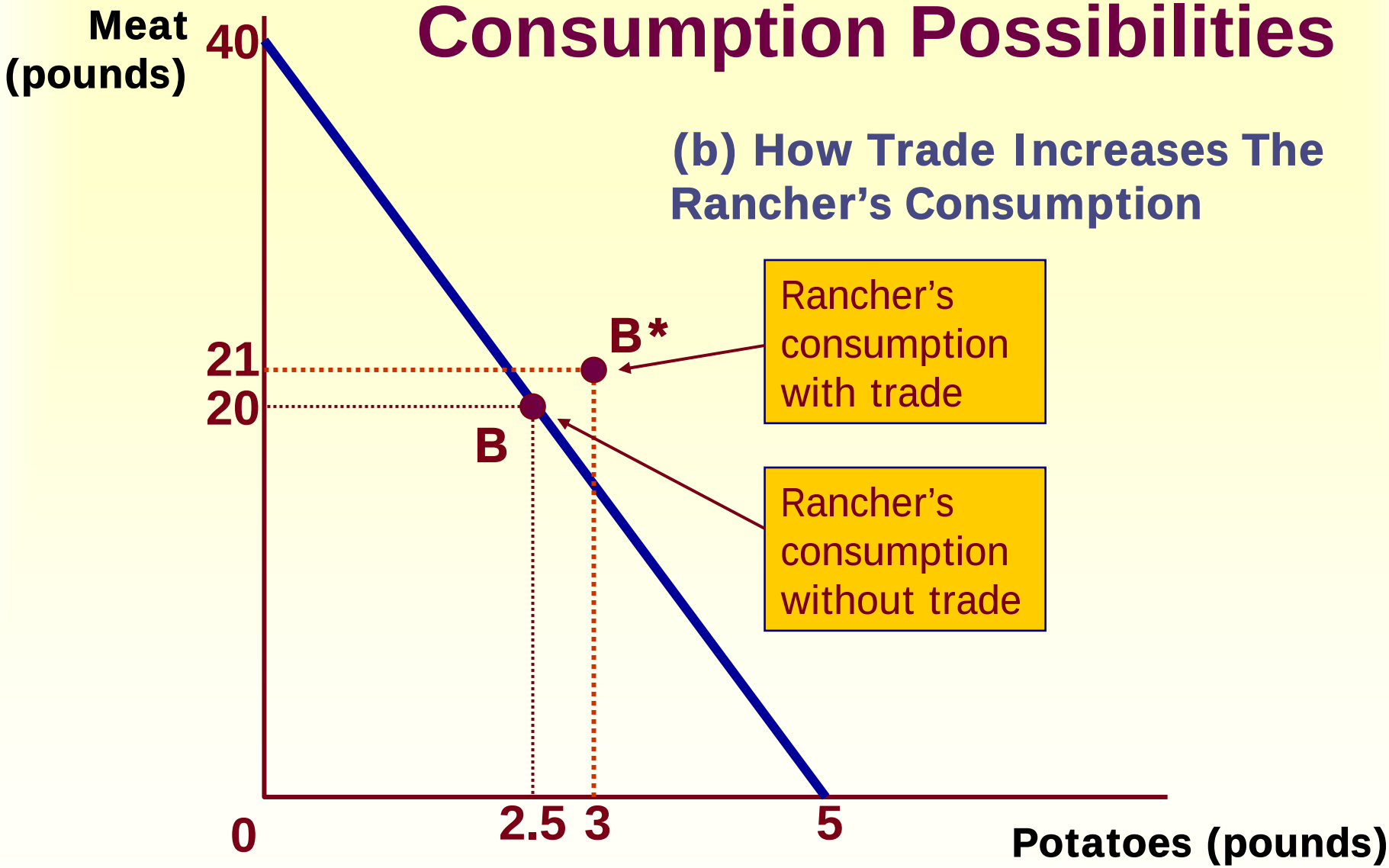
Trade Expands the Set of Consumption Possibilities



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The Gains from Trade: A Summary

	The Gains From Trade:
	The Increase in Consumption
Farmer	2 lbs meat (A*- A) 1 lb potatoes
Rancher	1 lb meat (B*- B) 1/2 lb potatoes

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The Principle of Comparative Advantage

Differences in the costs of production determine the following:

- **Who should produce what?**
- **How much should be traded for each product?**

Who can produce potatoes at a lower cost--the farmer or the rancher?

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Differences in Costs of Production

Two ways to measure differences in costs of production:

- **The number of hours required to produce a unit of output. (for example, one pound of potatoes)**
- **The opportunity cost of sacrificing one good for another.**

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Absolute Advantage

- Describes the productivity of one person, firm, or nation compared to that of another.
- The producer that requires a smaller quantity of inputs to produce a good is said to have an **absolute advantage** in producing that good.

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Comparative Advantage

- Compares producers of a good according to their ***opportunity cost.***
- The producer who has the smaller opportunity cost of producing a good is said to have a **comparative advantage** in producing that good.

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Specialization and Trade

- **Who has the absolute advantage?**

  The farmer or the rancher?

- **Who has the comparative advantage?**

  The farmer or the rancher?

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Absolute Advantage

- **The Rancher needs only 8 hours to produce a pound of potatoes, whereas the Farmer needs 10 hours.**
- **The Rancher needs only 1 hour to produce a pound of meat, whereas the Farmer needs 20 hours.**

The Rancher has an absolute advantage in the production of both meat and potatoes.

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The Opportunity Cost of Meat and Potatoes

	Opportunity Cost of:	
	1 lb of Meat	**1 lb of Potatoes**
Farmer	2 lb potatoes	? lb meat
Rancher	1/8 lb potatoes	8 lb meat

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Comparative Advantage

- The Rancher's opportunity cost of a pound of potatoes is 8 pounds of meat, whereas the Farmer's opportunity cost of a pound of potatoes is 1/2 pound of meat.
- The Rancher's opportunity cost of a pound of meat is only 1/8 pound of potatoes, while the Farmer's opportunity cost of a pound of meat is 2 pounds of potatoes...

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Comparative Advantage

…so, the Rancher has a comparative advantage in the production of meat but the Farmer has a comparative advantage in the production of potatoes.

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The Principle of Comparative Advantage

- Comparative advantage and differences in opportunity costs are the basis for specialized production and trade.
- Whenever potential trading parties have differences in opportunity costs, they can each benefit from trade.

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Benefits of Trade

Trade can benefit everyone in a society because it allows people to specialize in activities in which they have a comparative advantage.

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Adam Smith and Trade

In his 1776 book *An Inquiry into the Nature and Causes of the Wealth of Nations*, Adam Smith performed a detailed analysis of trade and economic interdependence, which economists still adhere to today.

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David Ricardo and Trade

In his 1816 book *Principles of Political Economy and Taxation*, David Ricardo developed the principle of comparative advantage as we know it today.

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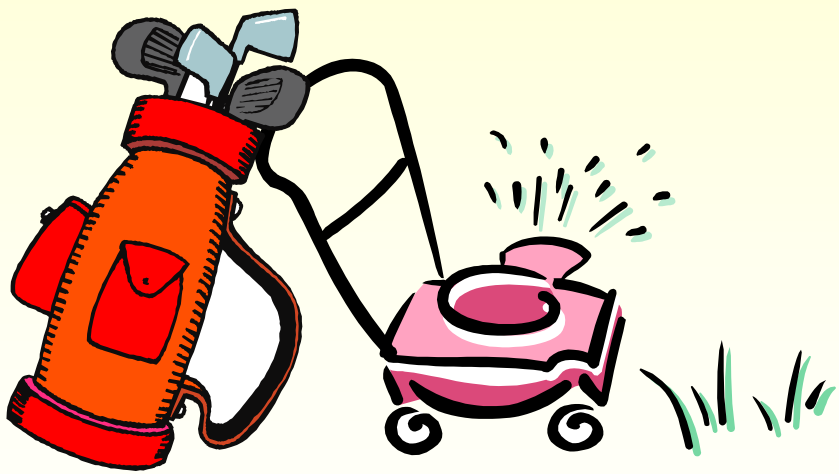
Should Tiger Woods Mow His Own Lawn?

?

?

?



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Summary

- **Interdependence and trade allow people to enjoy a greater quantity and variety of goods and services.**

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Summary

- The person who can produce a good with a smaller quantity of inputs has an absolute advantage.
- The person with a smaller opportunity cost has a comparative advantage.

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Summary

- The gains from trade are based on comparative advantage, not absolute advantage.
- Comparative advantage applies to countries as well as to people.

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Graphical Review

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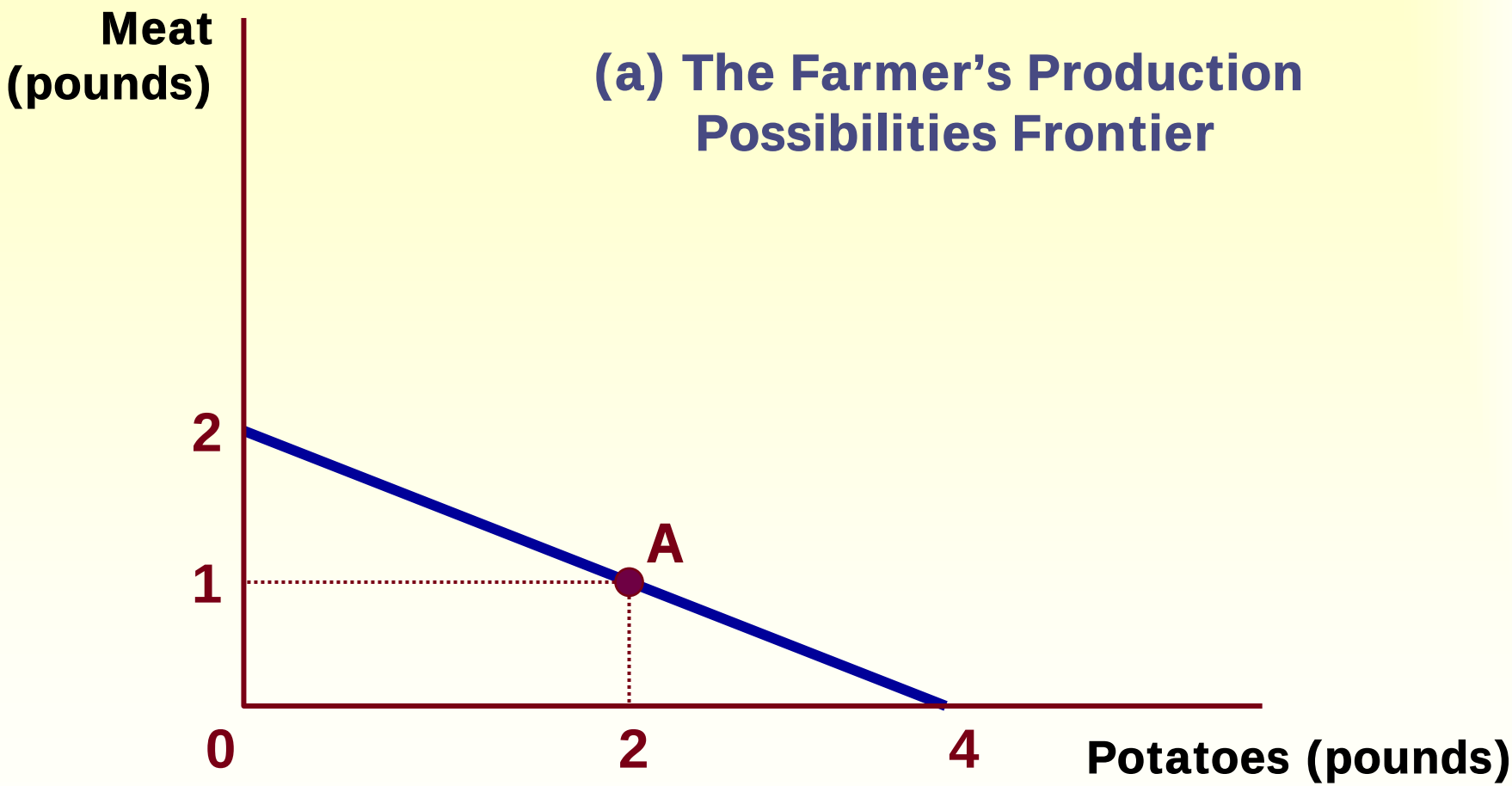
Production Possibilities Frontiers



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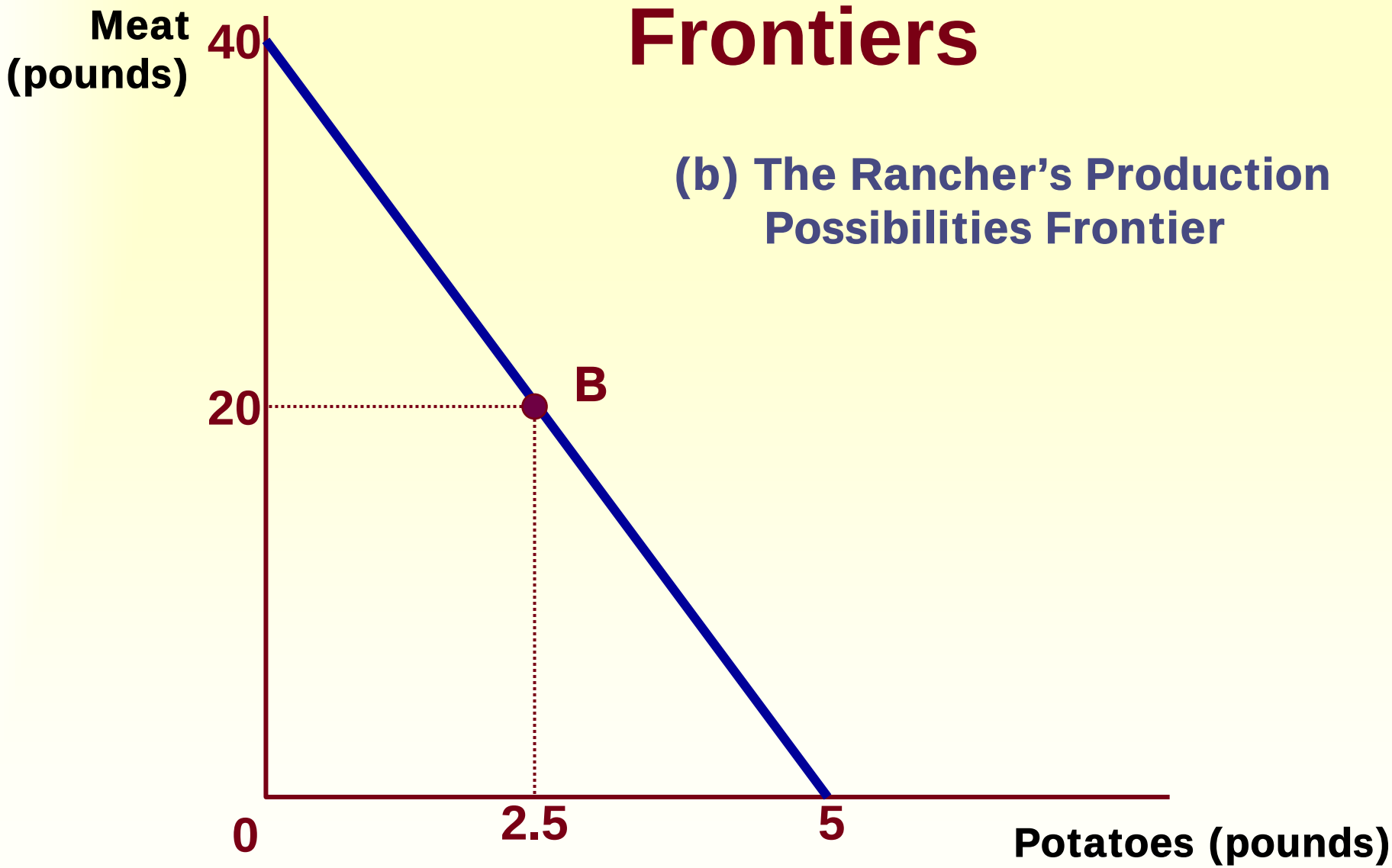
Production Possibilities Frontiers



(b) The Rancher's Production Possibilities Frontier

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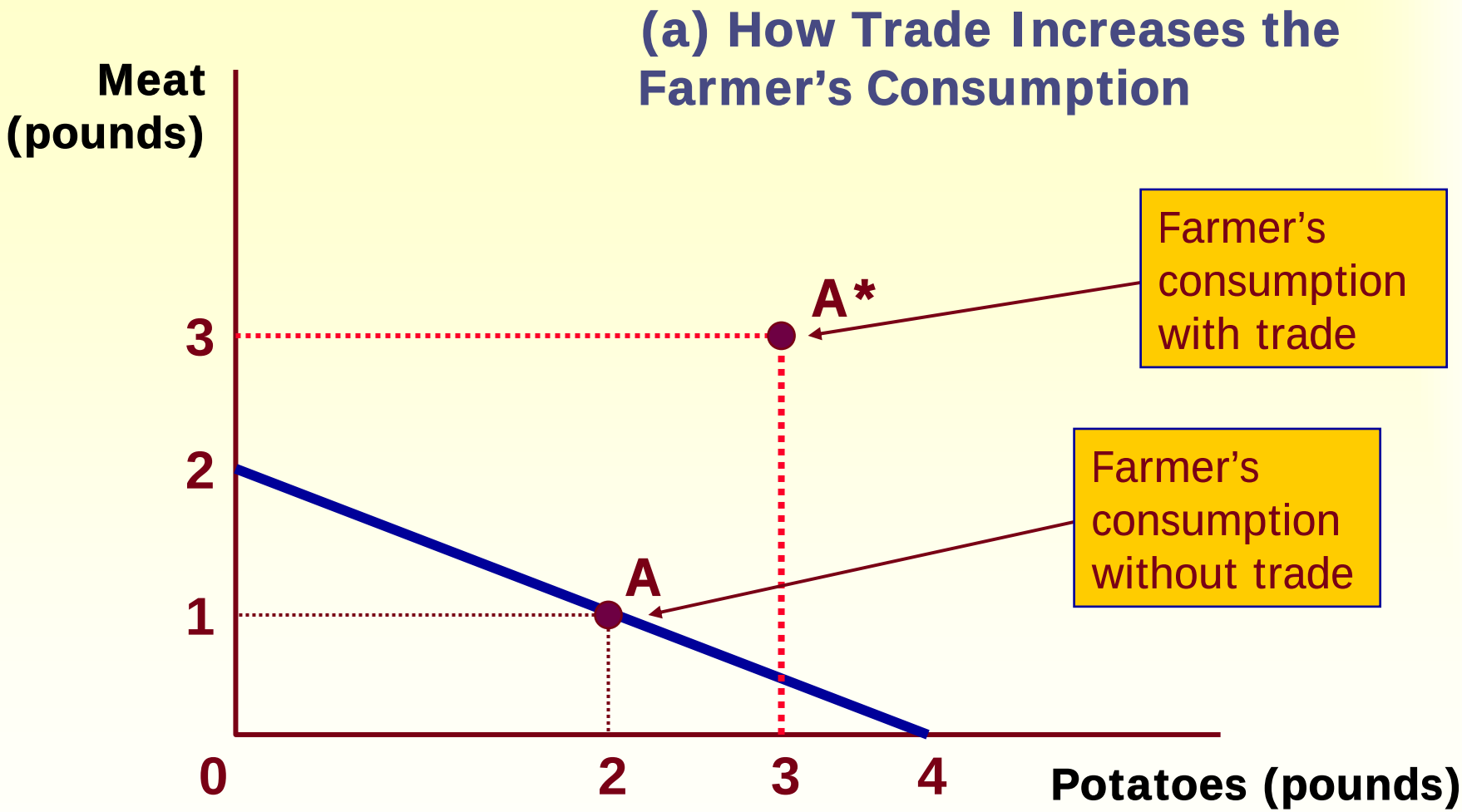
Trade Expands the Set of Consumption Possibilities



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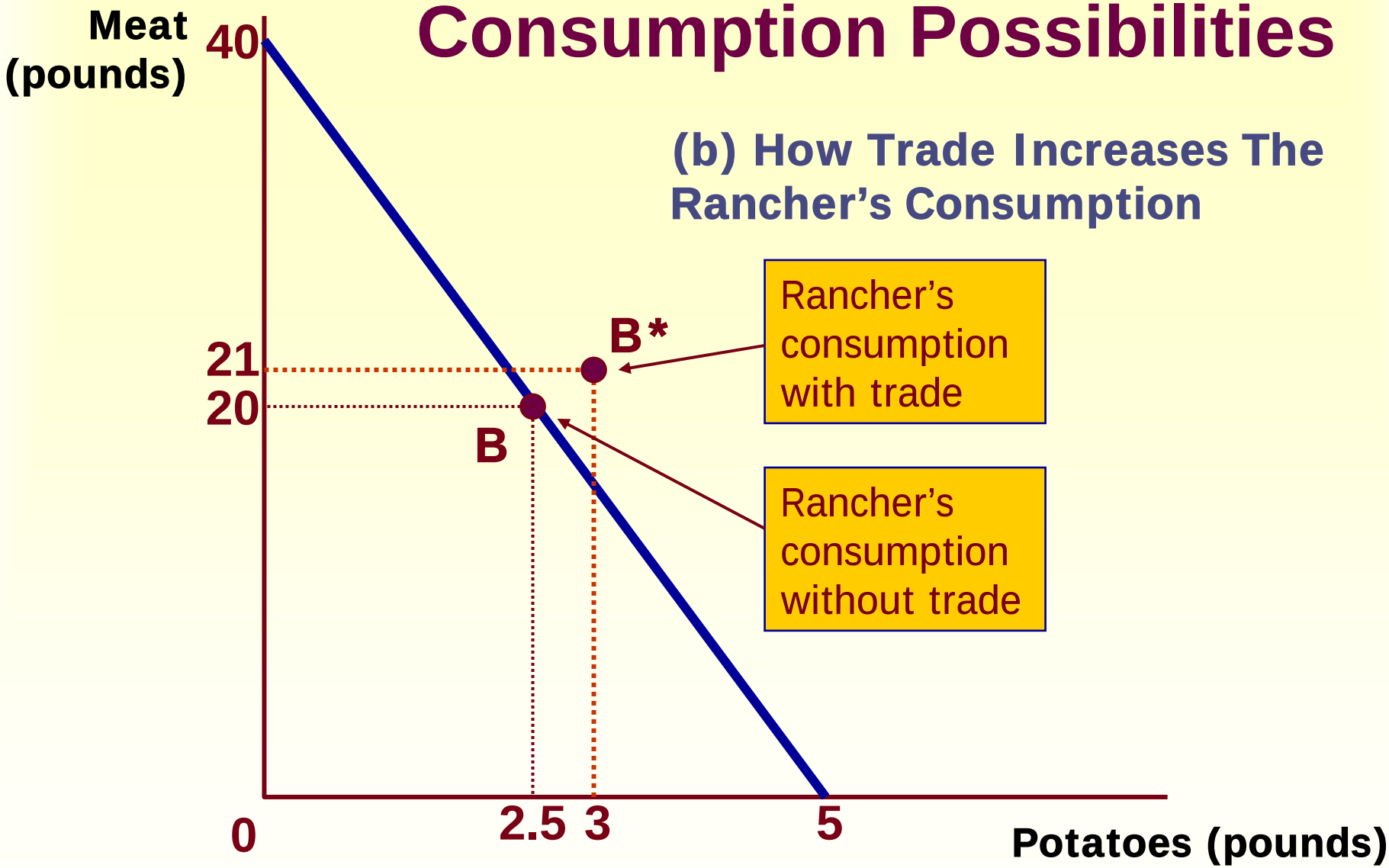
Trade Expands the Set of Consumption Possibilities



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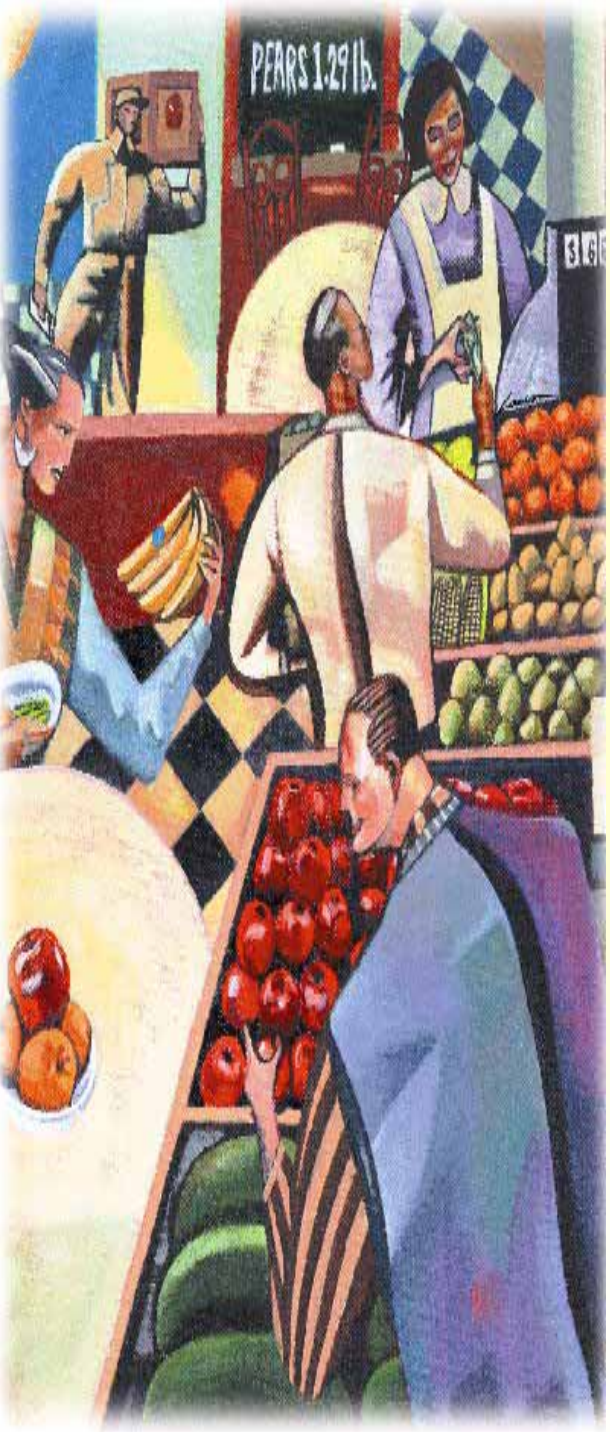

The Market Forces of Supply and Demand

Chapter 4

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The Market Forces of Supply and Demand

- ***Supply*** **and** ***demand*** **are the two words that economists use most often.**
- ***Supply*** **and** ***demand*** **are the forces that make market economies work.**
- **Modern microeconomics is about supply, demand, and market equilibrium.**

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Markets

- A **market** is a group of buyers and sellers of a particular good or service.
- The terms supply and demand refer to the behavior of people . . . as they interact with one another in **markets**.

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Markets

- Buyers determine **demand.**

- Sellers determine **supply.**

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Market Type:
A Competitive Market

A competitive market is a market. . .

…with *many* buyers and sellers.

…that is not controlled by any one person.

…in which a *narrow range of prices* are established that buyers and sellers act upon.

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Competition: Perfect and Otherwise

Perfect Competition

- Products are the same
- Numerous buyers and sellers so that each has no influence over price
- Buyers and Sellers are price takers

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Competition: *Perfect and Otherwise*

- **Monopoly**
  - *One seller, and seller controls price*
- **Oligopoly**
  - *Few sellers*
  - *Not always aggressive competition*

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Competition: *Perfect and Otherwise*

- **Monopolistic Competition**
  - ***Many sellers***
  - ***Slightly differentiated products***
  - ***Each seller may set price for its own product***

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Demand

Quantity demanded
is the amount
of a good that buyers are
willing and able
to purchase.

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Law of Demand

The law of demand states that there is an *inverse relationship* between price and quantity demanded.

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Demand Schedule

The demand schedule is a table that shows the relationship between the price of the good and the quantity demanded.

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Demand Schedule

Price	Quantity
$0.00	12
0.50	10
1.00	8
1.50	6
2.00	4
2.50	2
3.00	0

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Determinants of Demand

- Market price
- Consumer income
- Prices of related goods
- Tastes
- Expectations

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Demand Curve

The demand curve is the downward-sloping line relating price to quantity demanded.

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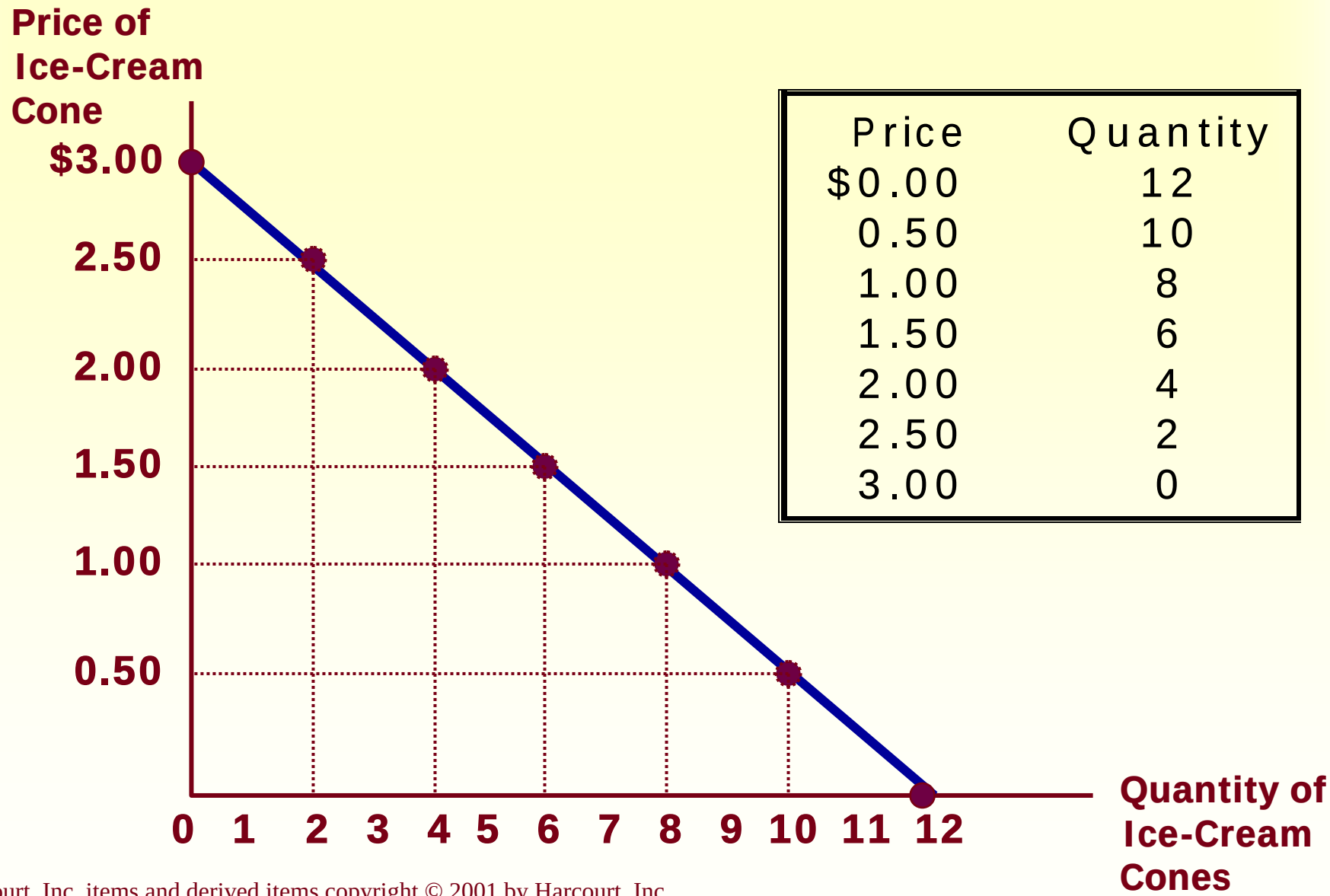
Demand Curve



Price	Quantity
$0.00	12
0.50	10
1.00	8
1.50	6
2.00	4
2.50	2
3.00	0

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Ceteris Paribus

Ceteris paribus **is a Latin phrase that means all variables other than the ones being studied are assumed to be constant. Literally, *ceteris paribus* means "other things being equal."**

The demand curve slopes downward because, ceteris paribus, lower prices imply a greater quantity demanded!

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Market Demand

- **Market demand** refers to the sum of all individual demands for a particular good or service.
- Graphically, individual demand curves are summed ***horizontally*** to obtain the market demand curve.

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Determinants of Demand

- Market price
- Consumer income
- Prices of related goods
- Tastes
- Expectations

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Change in Quantity Demanded versus Change in Demand

Change in Quantity Demanded

- **Movement along the demand curve.**
- **Caused by a change in the *price* of the product.**

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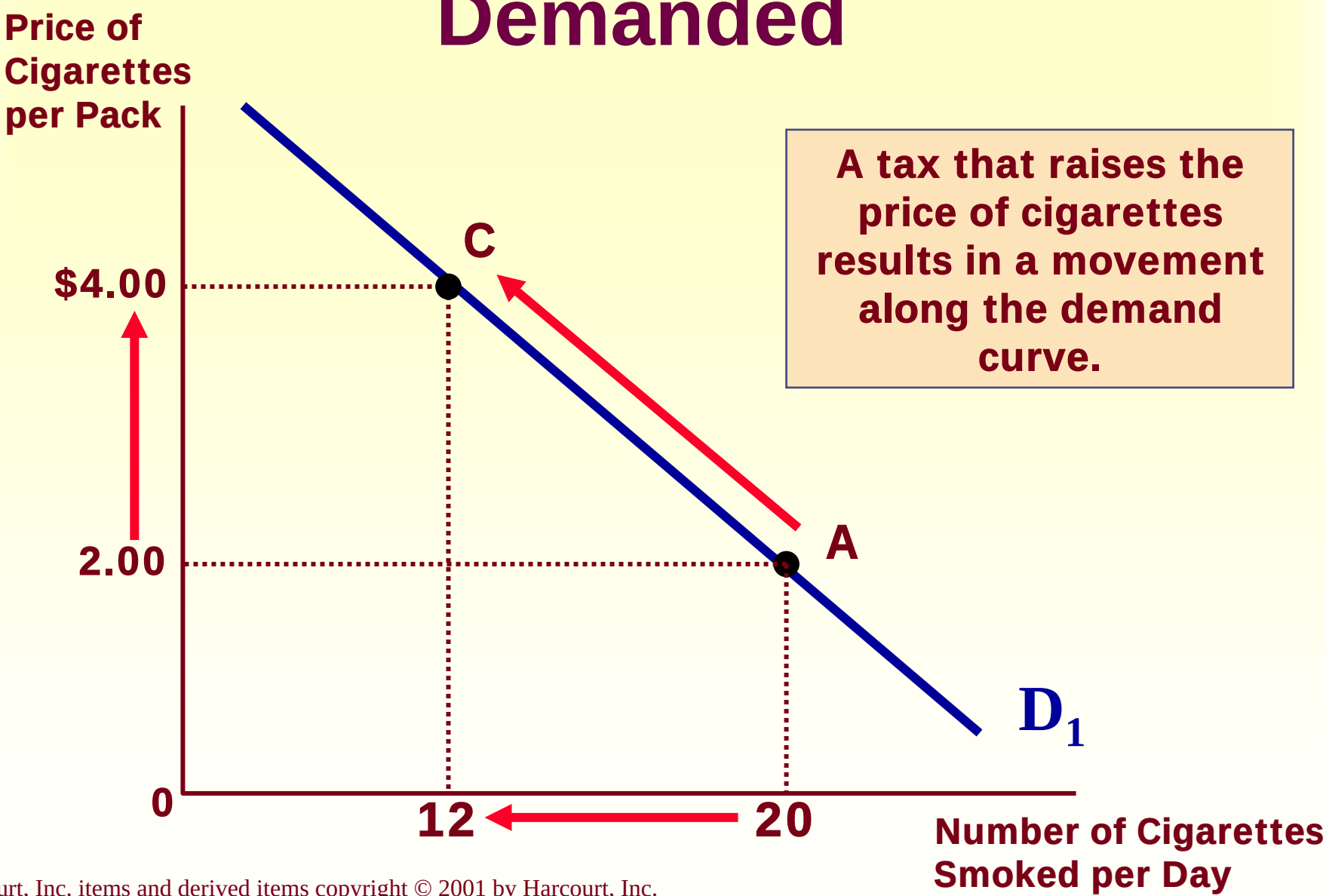
Changes in Quantity Demanded



A tax that raises the price of cigarettes results in a movement along the demand curve.

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Change in Quantity Demanded versus Change in Demand

Change in Demand

- A shift in the demand curve, either to the left or right.
- Caused by a change in a determinant other than the price.

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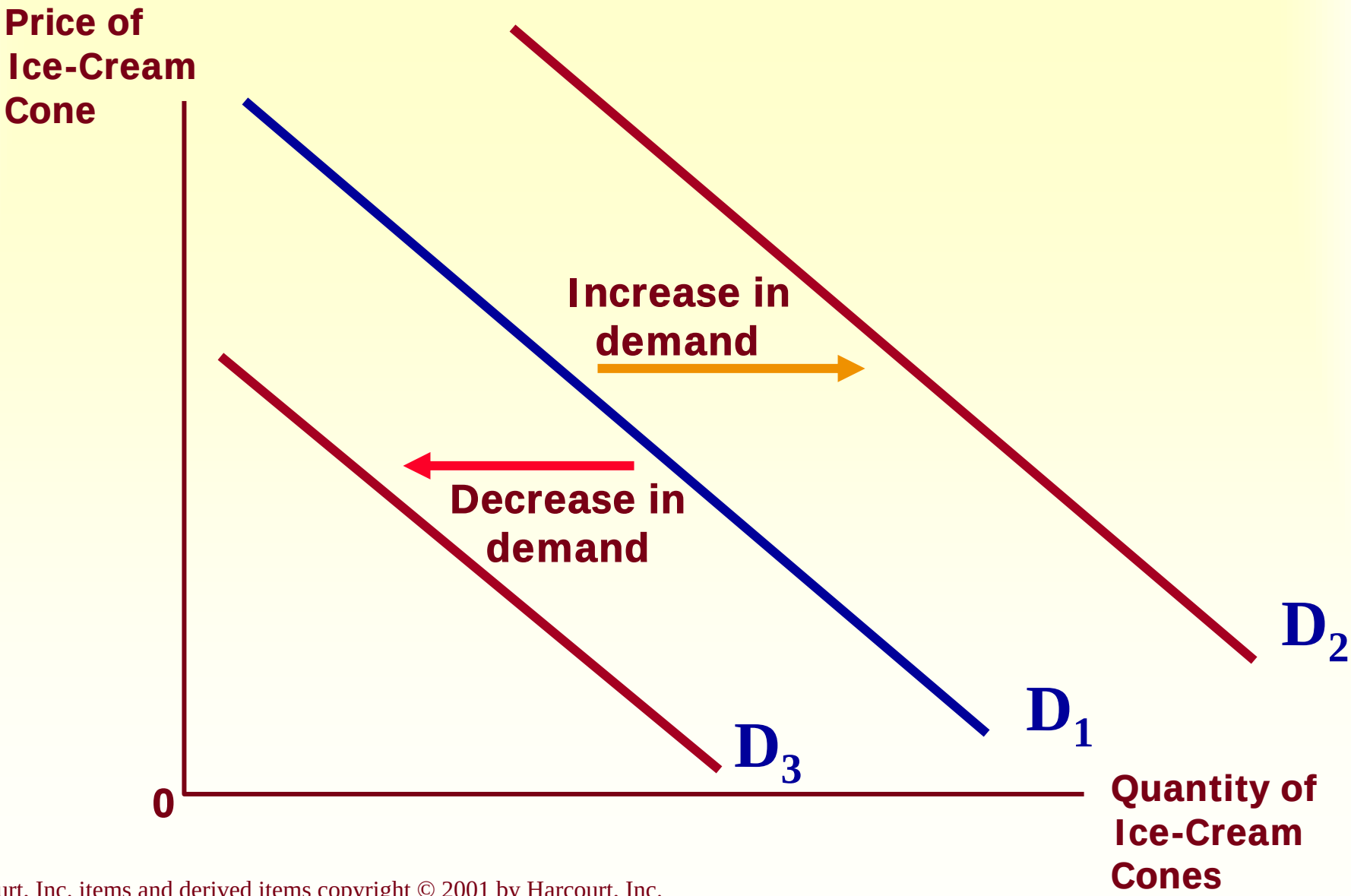
Changes in Demand



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Consumer Income

- As income increases the demand for a **normal good** will *increase*.
- As income increases the demand for an **inferior good** will *decrease*.

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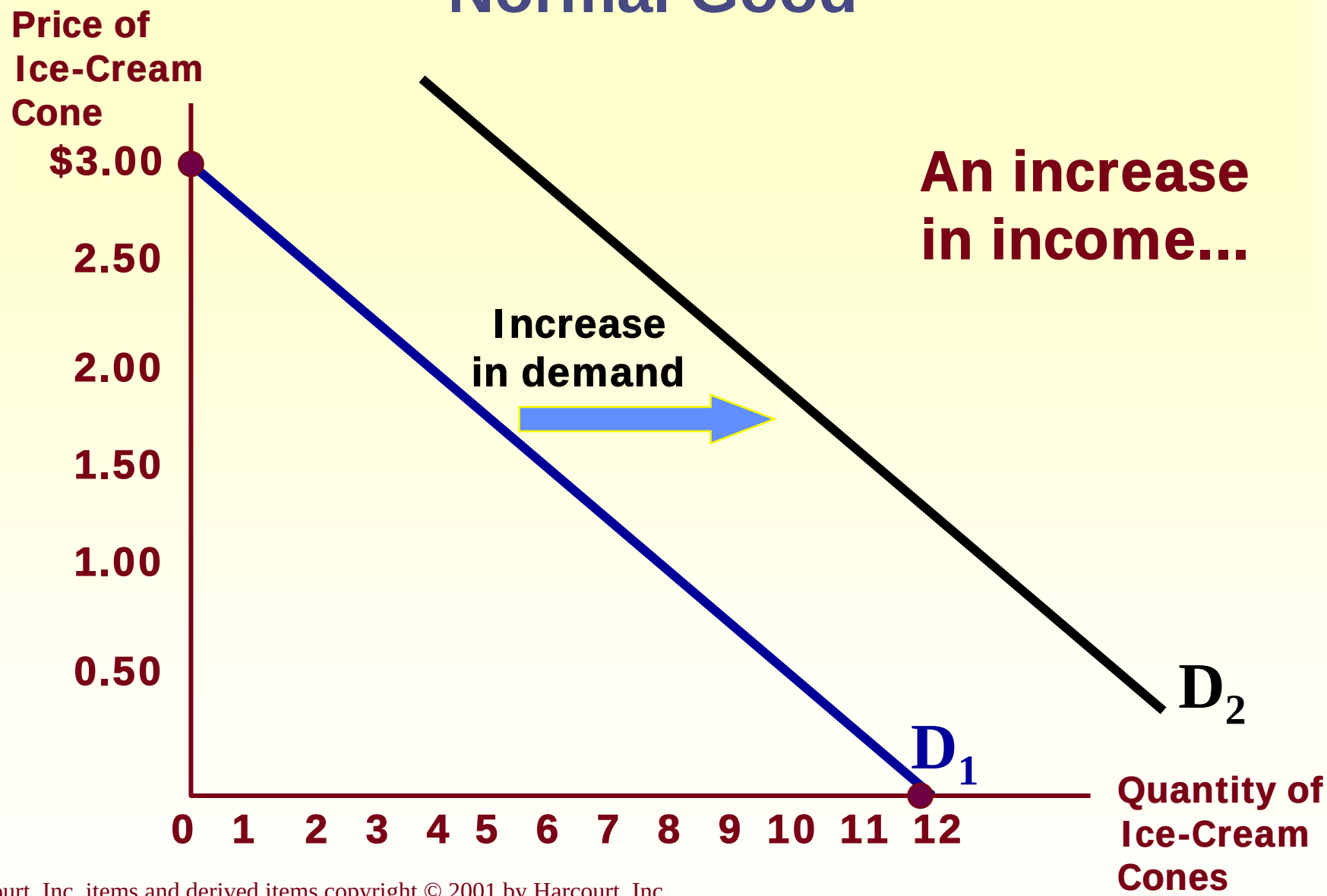
Consumer Income

Normal Good



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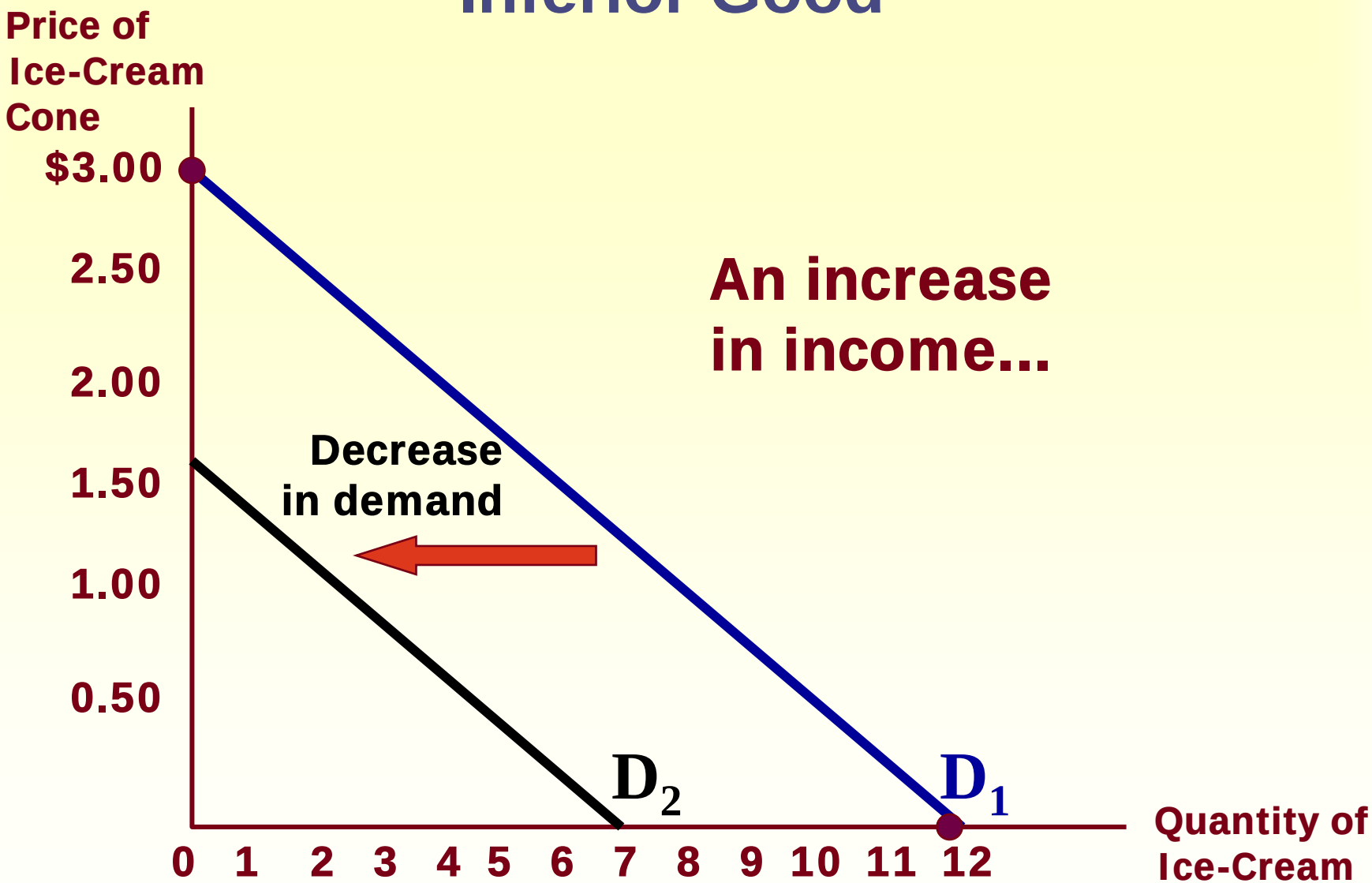
Consumer Income

Inferior Good



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Prices of Related Goods
Substitutes & Complements

- When a fall in the price of one good reduces the demand for another good, the two goods are called **substitutes.**
- When a fall in the price of one good increases the demand for another good, the two goods are called **complements.**

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Change in Quantity Demanded versus Change in Demand

Variables that Affect Quantity Demanded	A Change in This Variable . . .
Price	Represents a movement along the demand curve
Income	Shifts the demand curve
Prices of related goods	Shifts the demand curve
Tastes	Shifts the demand curve
Expectations	Shifts the demand curve
Number of buyers	Shifts the demand curve

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Supply

Quantity supplied is the amount of a good that sellers are willing and able to sell.

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Law of Supply

The law of supply states that there is a *direct (positive) relationship* between price and quantity supplied.

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Determinants of Supply

- Market price
- Input prices
- Technology
- Expectations
- Number of producers

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Supply Schedule

The supply schedule is a table that shows the relationship between the price of the good and the quantity supplied.

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Supply Schedule

Price	Quantity
$0.00	0
0.50	0
1.00	1
1.50	2
2.00	3
2.50	4
3.00	5

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Supply Curve

The supply curve is the upward-sloping line relating price to quantity supplied.

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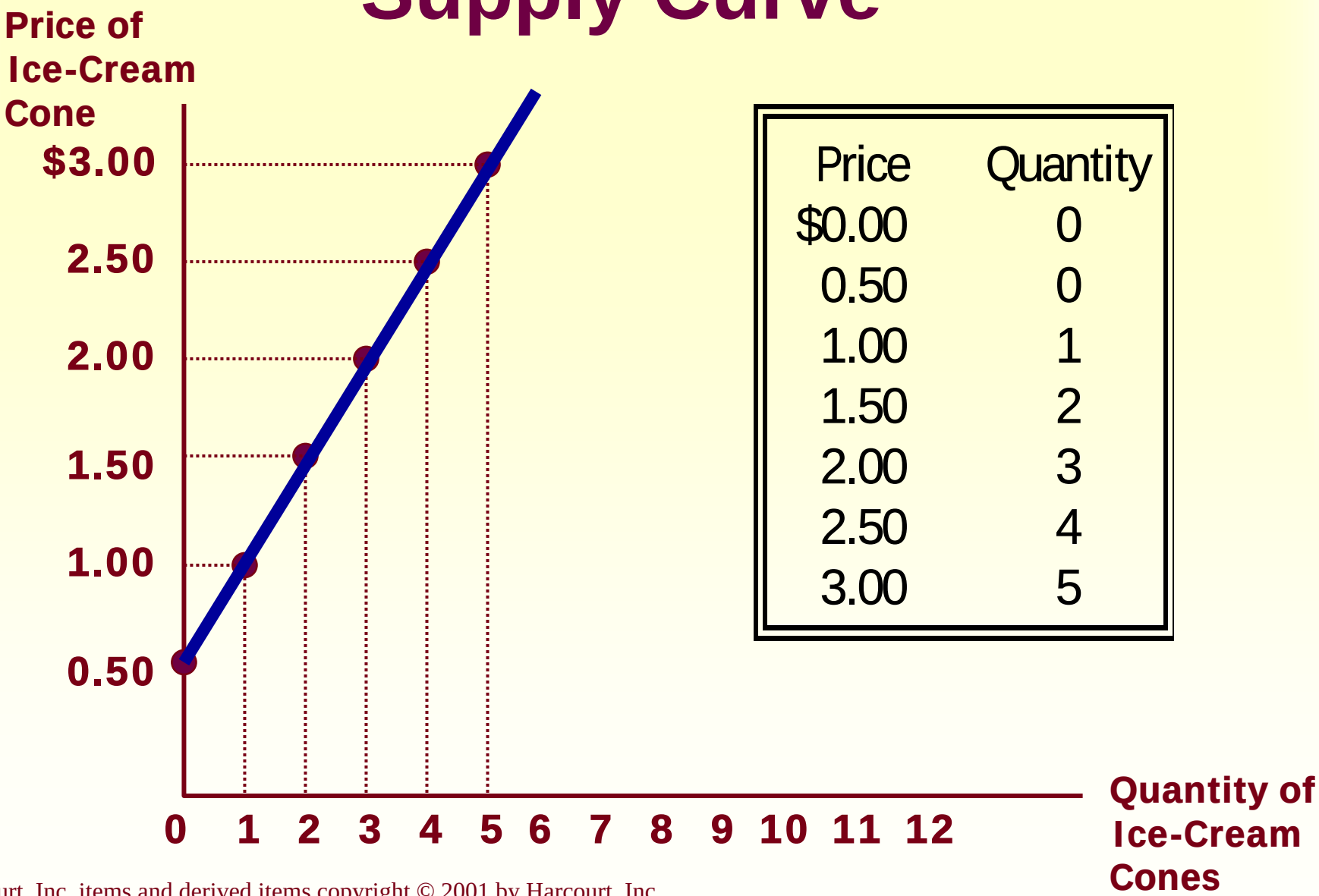
Supply Curve



Price	Quantity
$0.00	0
0.50	0
1.00	1
1.50	2
2.00	3
2.50	4
3.00	5

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Market Supply

- **Market supply** refers to the sum of all individual supplies for all sellers of a particular good or service.
- Graphically, individual supply curves are summed ***horizontally*** to obtain the market supply curve.

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Determinants of Supply

- Market price
- Input prices
- Technology
- Expectations
- Number of producers

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Change in Quantity Supplied versus Change in Supply

Change in Quantity Supplied

- **Movement along the supply curve.**
- **Caused by a change in the market price of the product.**

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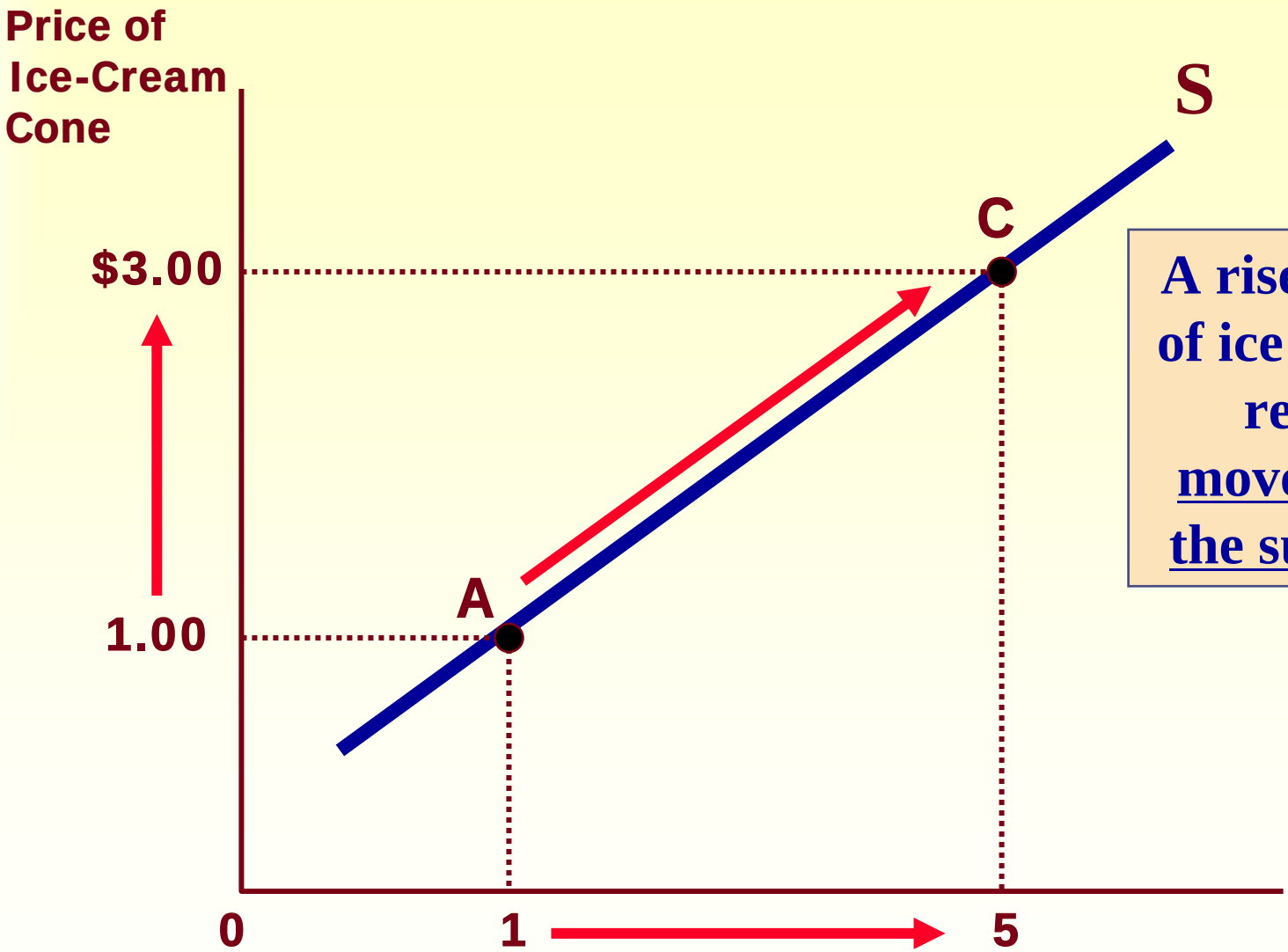
Change in Quantity Supplied



A rise in the price of ice cream cones results in a movement along the supply curve.

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Change in Quantity Supplied versus Change in Supply

Change in Supply

- A shift in the supply curve, either to the left or right.
- Caused by a change in a determinant other than price.

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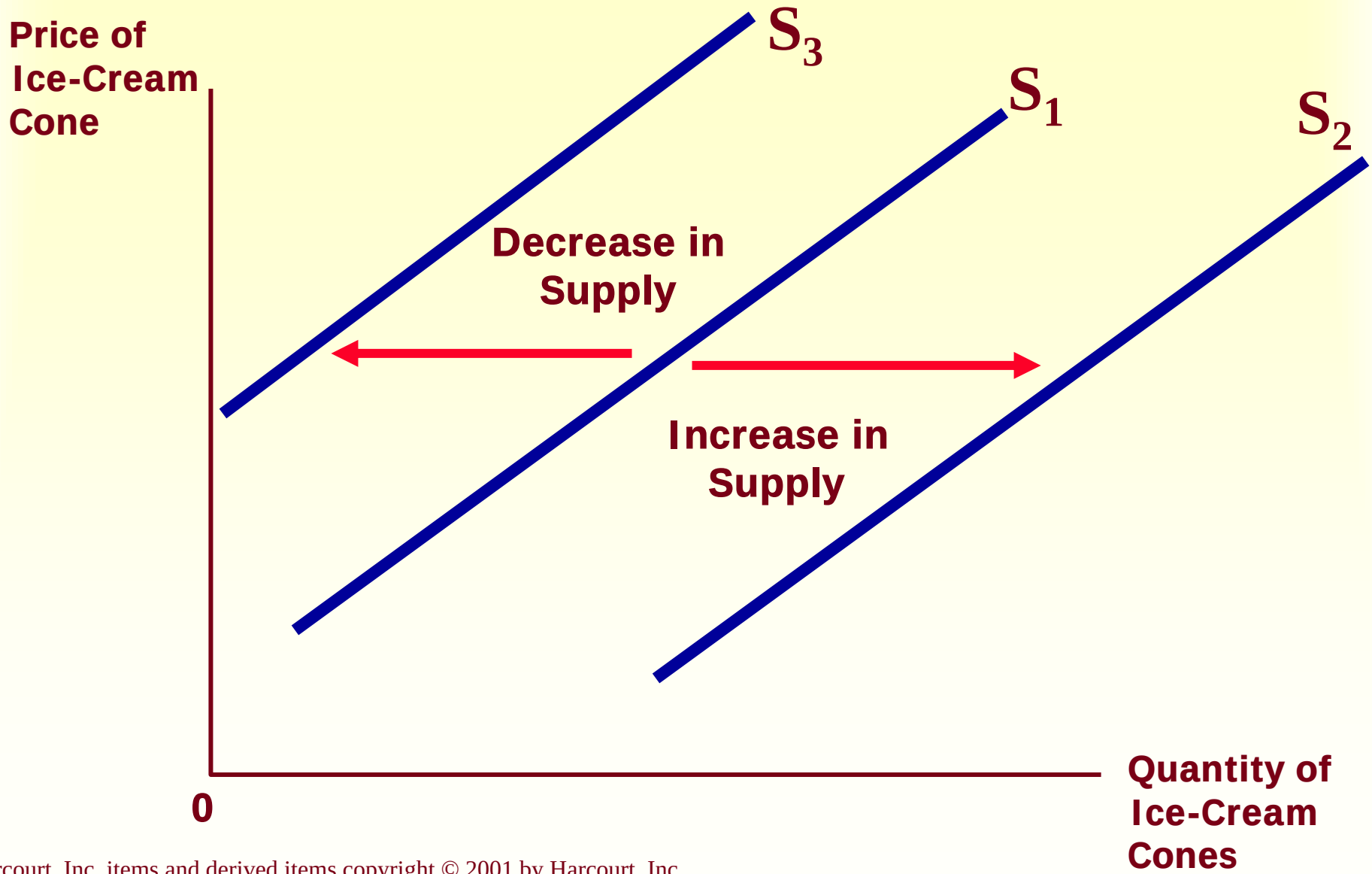
Change in Supply



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Change in Quantity Supplied versus Change in Supply

Variables that Affect Quantity Supplied	A Change in This Variable . . .
Price	Represents a movement along the supply curve
Input prices	Shifts the supply curve
Technology	Shifts the supply curve
Expectations	Shifts the supply curve
Number of sellers	Shifts the supply curve

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Supply and Demand Together

Equilibrium Price

- The price that balances supply and demand. On a graph, it is the price at which the supply and demand curves intersect.

Equilibrium Quantity

- The quantity that balances supply and demand. On a graph it is the quantity at which the supply and demand curves intersect.

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Supply and Demand Together

Demand Schedule

Price	Quantity
$0.00	19
0.50	16
1.00	13
1.50	10
2.00	7
2.50	4
3.00	1

Supply Schedule

Price	Quantity
$0.00	0
0.50	0
1.00	1
1.50	4
2.00	7
2.50	10
3.00	13

At $2.00, the quantity demanded is equal to the quantity supplied!

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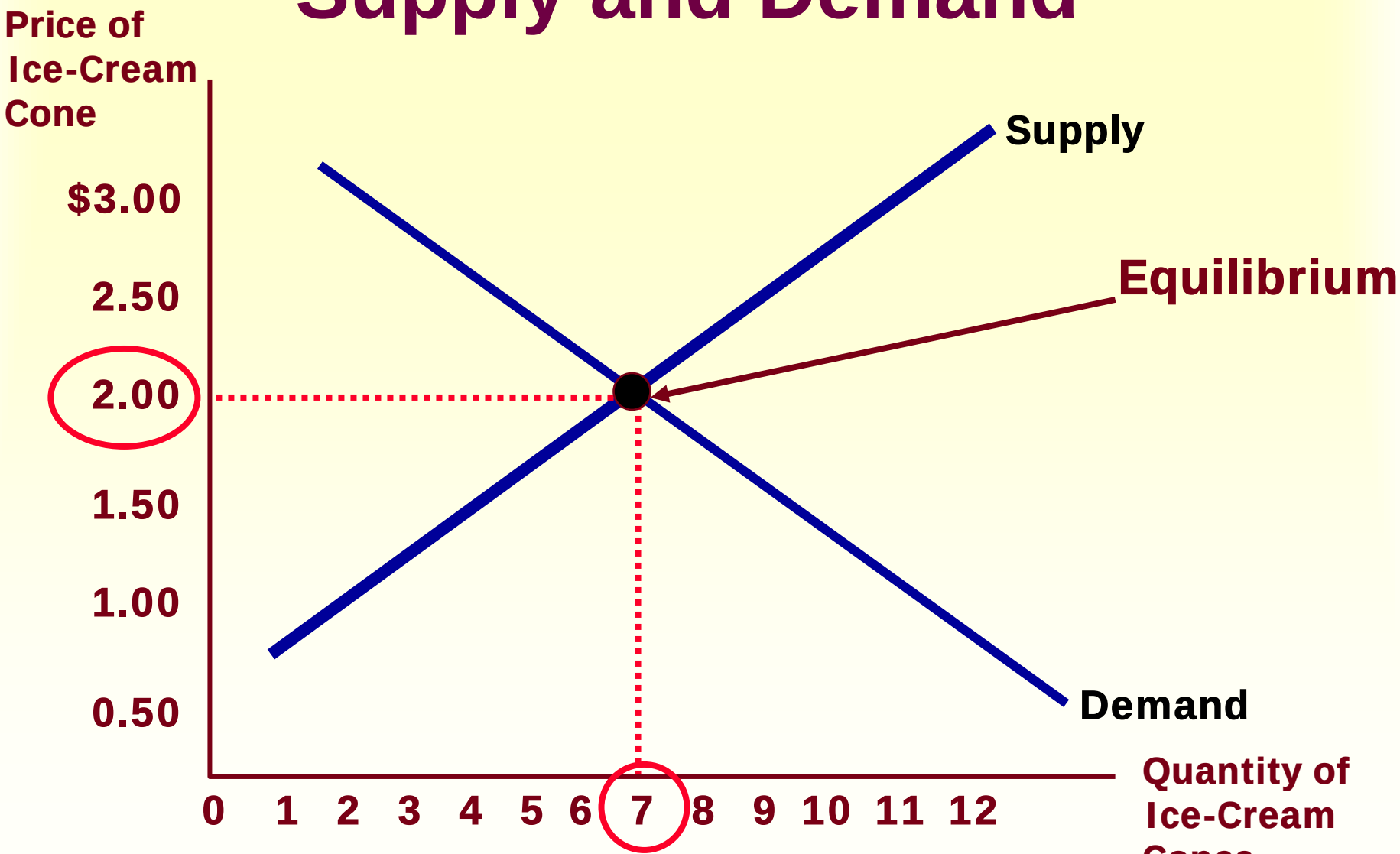
Equilibrium of Supply and Demand



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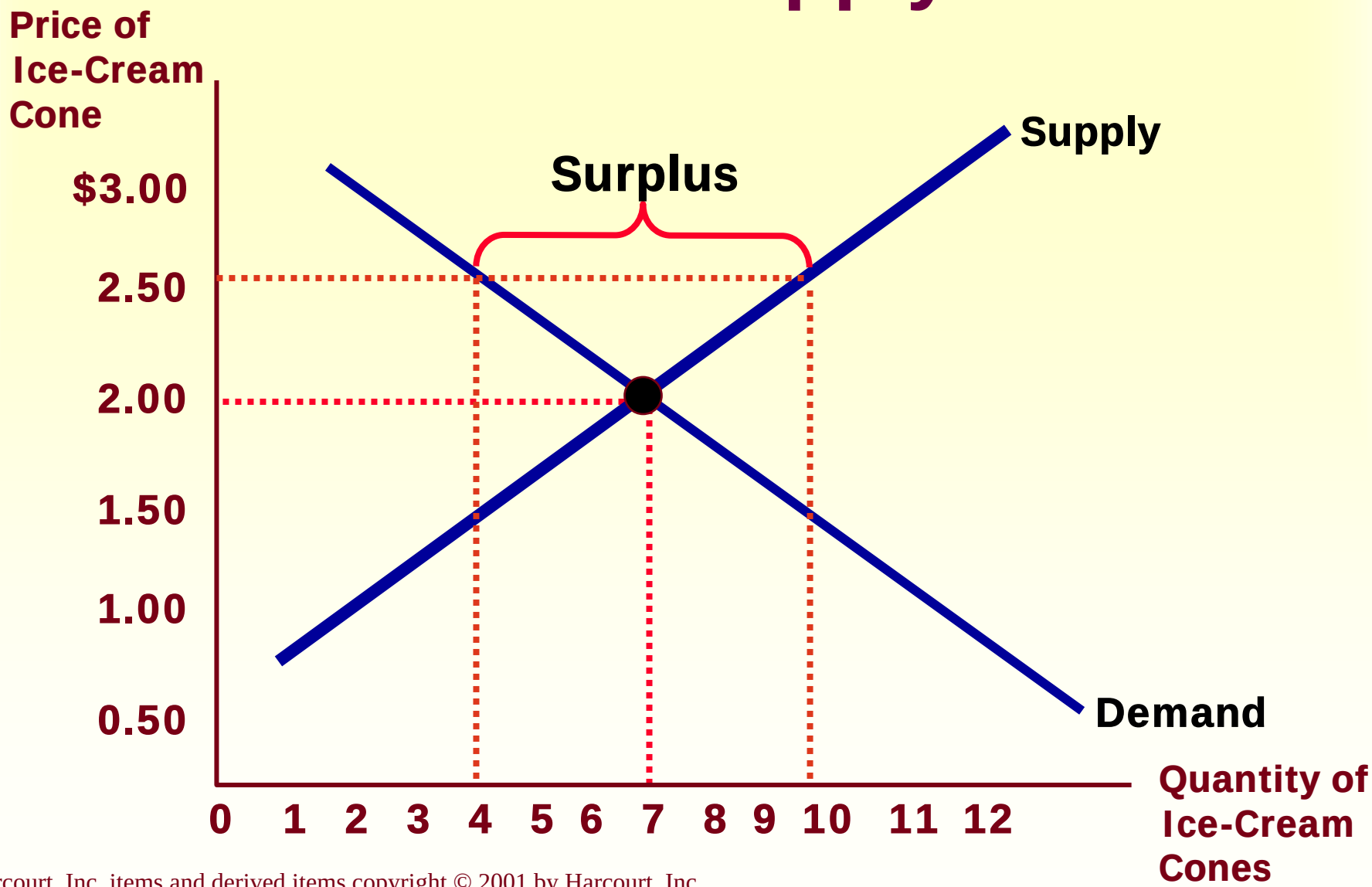
Excess Supply



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Surplus

When the price is *above* the equilibrium price, the quantity supplied exceeds the quantity demanded. There is excess supply or a surplus. Suppliers will lower the price to increase sales, thereby moving toward equilibrium.

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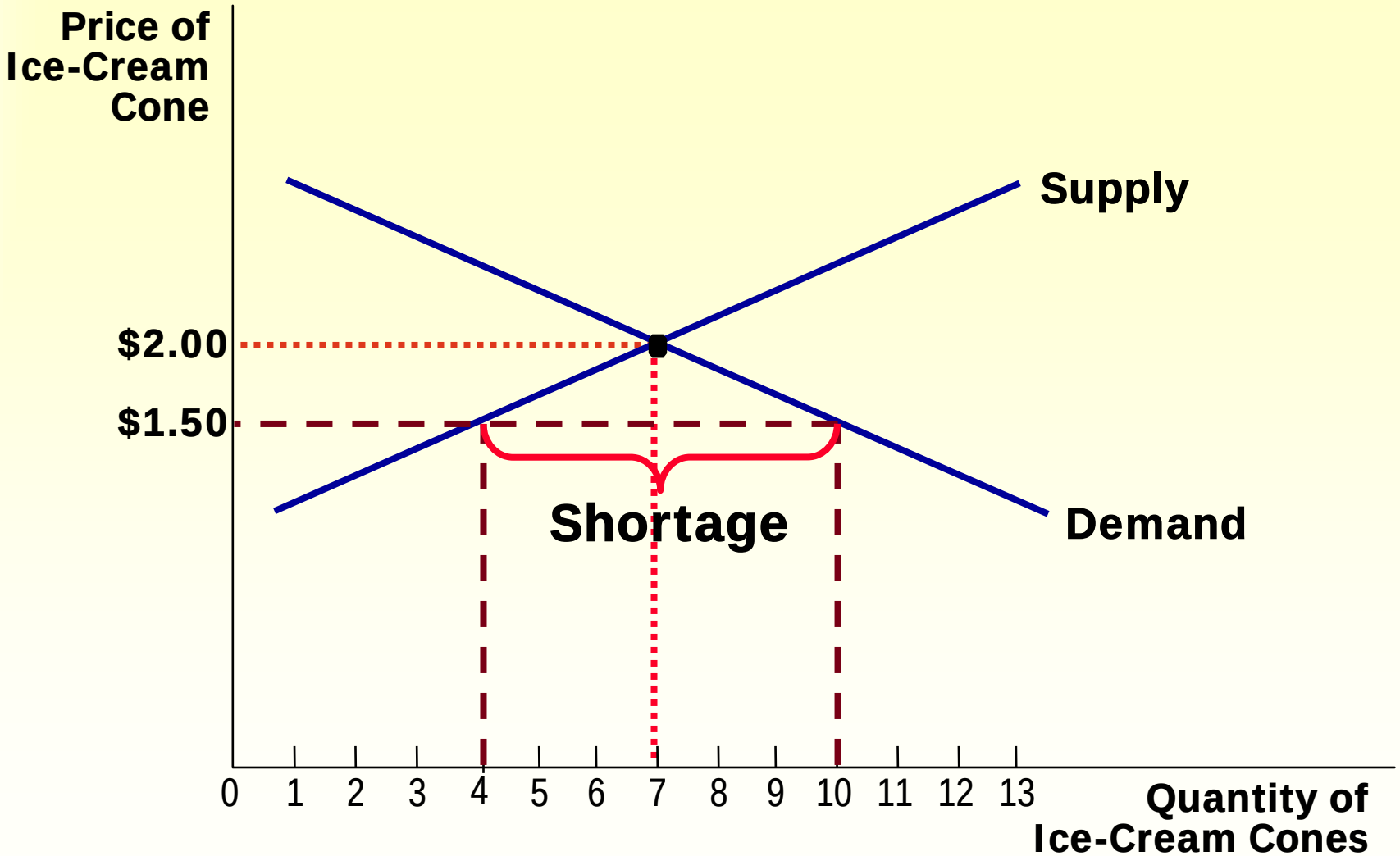
Excess Demand



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Shortage

When the price is *below* the equilibrium price, the quantity demanded exceeds the quantity supplied. There is excess demand or a shortage. Suppliers will raise the price due to too many buyers chasing too few goods, thereby moving toward equilibrium.

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Three Steps To Analyzing Changes in Equilibrium

- Decide whether the event shifts the supply or demand curve (or both).
- Decide whether the curve(s) shift(s) to the left or to the right.
- Examine how the shift affects equilibrium price and quantity.

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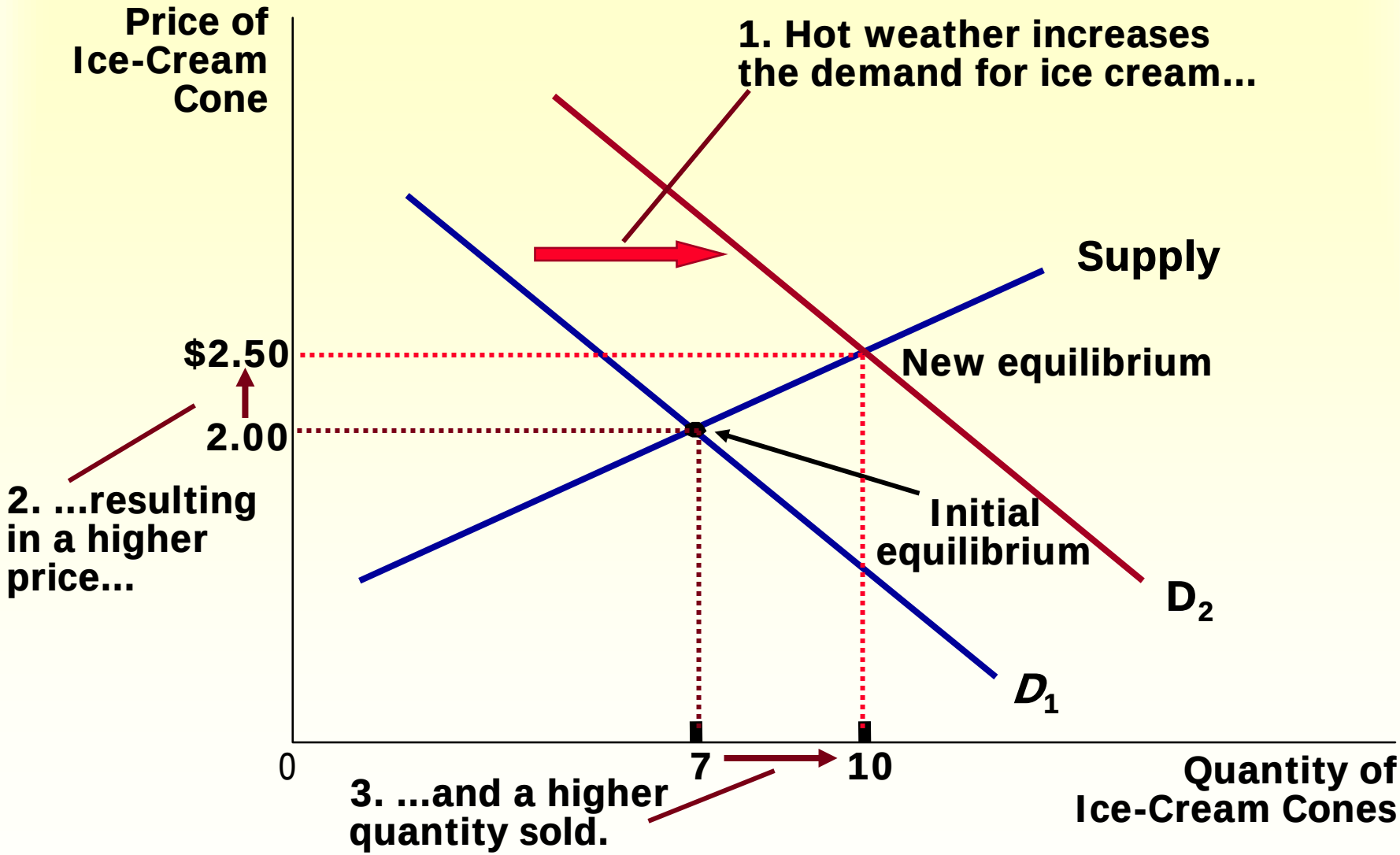
How an Increase in Demand Affects the Equilibrium



Shifts in Curves versus Movements along Curves

- A shift in the supply curve is called a ***change in supply.***
- A movement along a fixed supply curve is called a ***change in quantity supplied.***
- A shift in the demand curve is called a ***change in demand.***
- A movement along a fixed demand curve is called a ***change in quantity demanded.***

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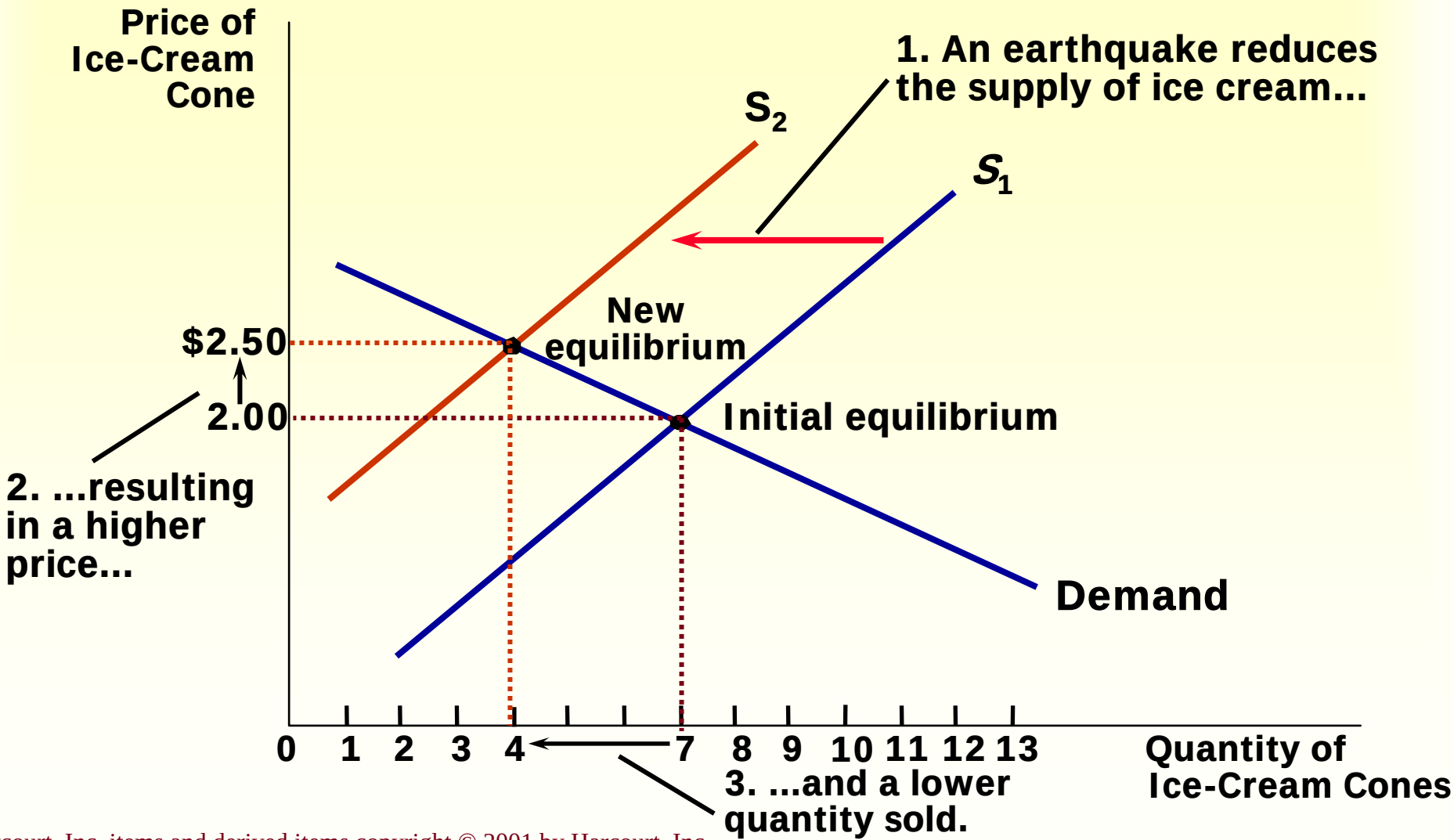
How a Decrease in Supply Affects the Equilibrium



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What Happens to Price and Quantity When Supply or Demand Shifts?

	No Change In Supply	An Increase In Supply	A Decrease In Supply
No Change In Demand	P same Q same	P down Q up	P up Q down
An Increase In Demand	P up Q up	P ambiguous Q up	P up Q ambiguous
A Decrease In Demand	P down Q down	P down Q ambiguous	P ambiguous Q down

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Summary

- Economists use the model of supply and demand to analyze competitive markets.
- The demand curve shows how the quantity of a good depends upon the price.

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Summary

- According to the law of demand, as the price of a good rises, the quantity demanded falls.
- In addition to price, other determinants of quantity demanded include income, tastes, expectations, and the prices of complements and substitutes.

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Summary

- The supply curve shows how the quantity of a good supplied depends upon the price.
- According to the law of supply, as the price of a good rises, the quantity supplied rises.

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Summary

- In addition to price, other determinants of quantity supplied include input prices, technology, and expectations.
- Market equilibrium is determined by the intersection of the supply and demand curves.

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Summary

- Supply and demand together determine the prices of the economy's goods and services.
- In market economies, prices are the signals that guide the allocation of resources.

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Graphical Review

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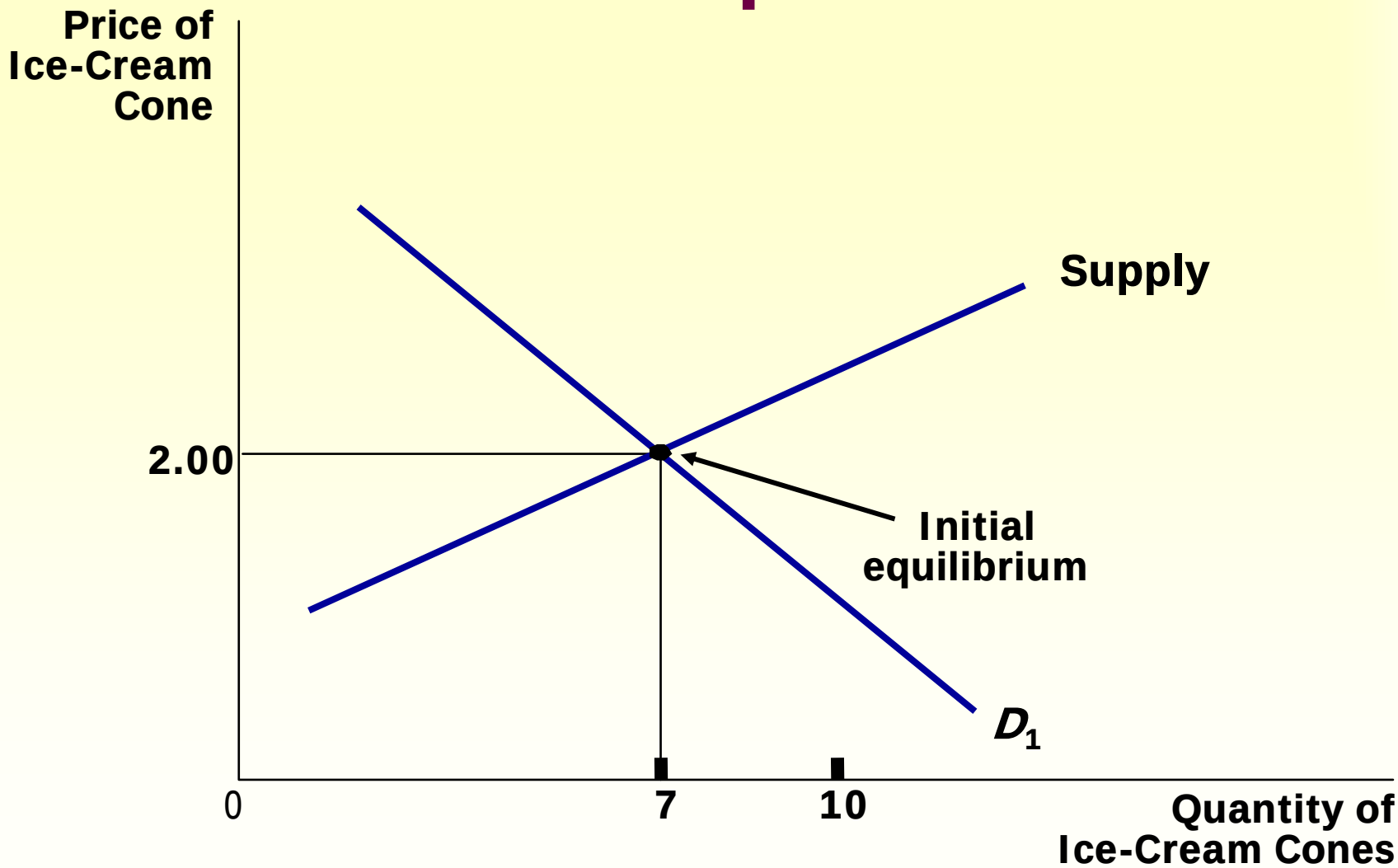
How an Increase in Demand Affects the Equilibrium



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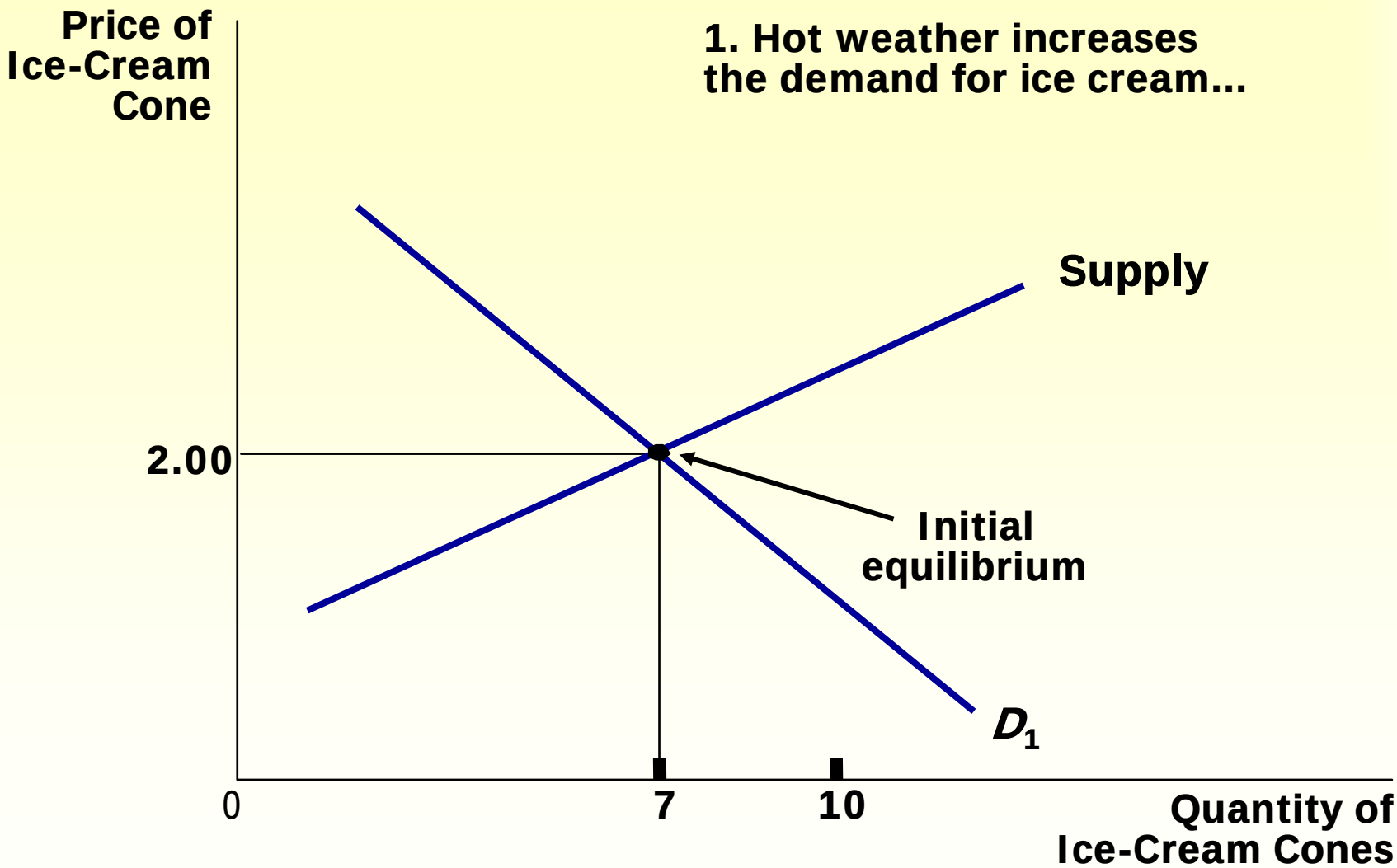
How an Increase in Demand Affects the Equilibrium



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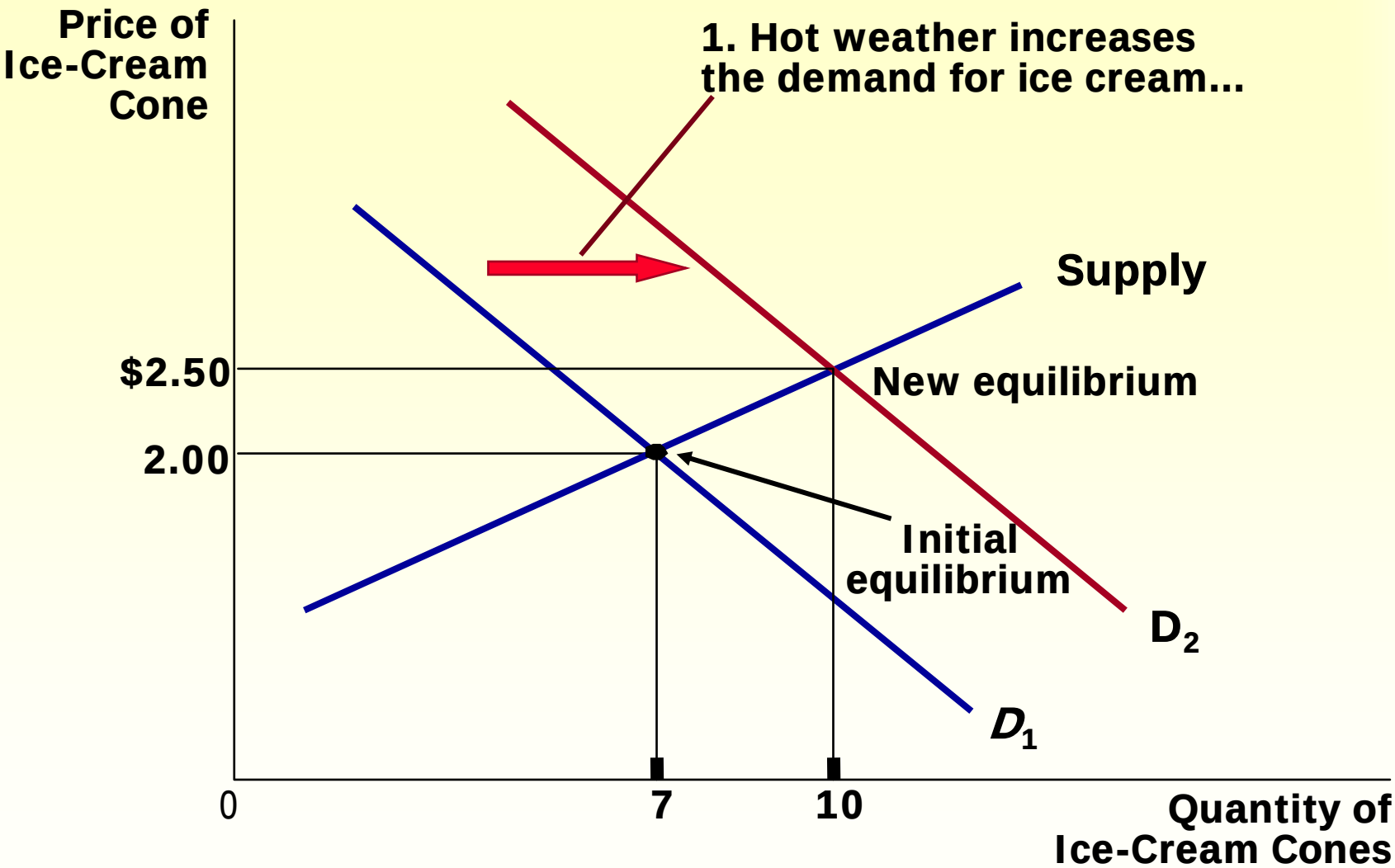
How an Increase in Demand Affects the Equilibrium



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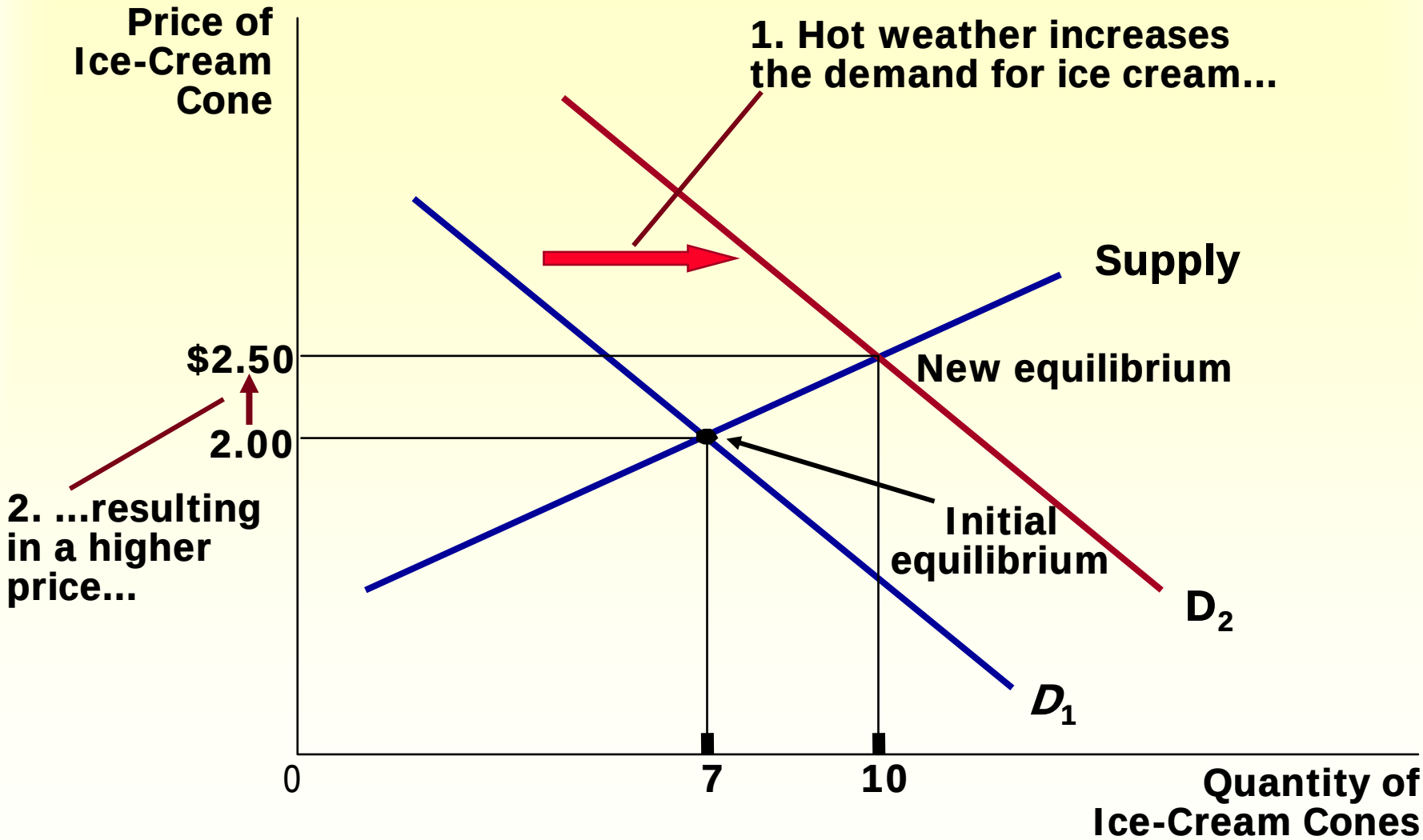
How an Increase in Demand Affects the Equilibrium



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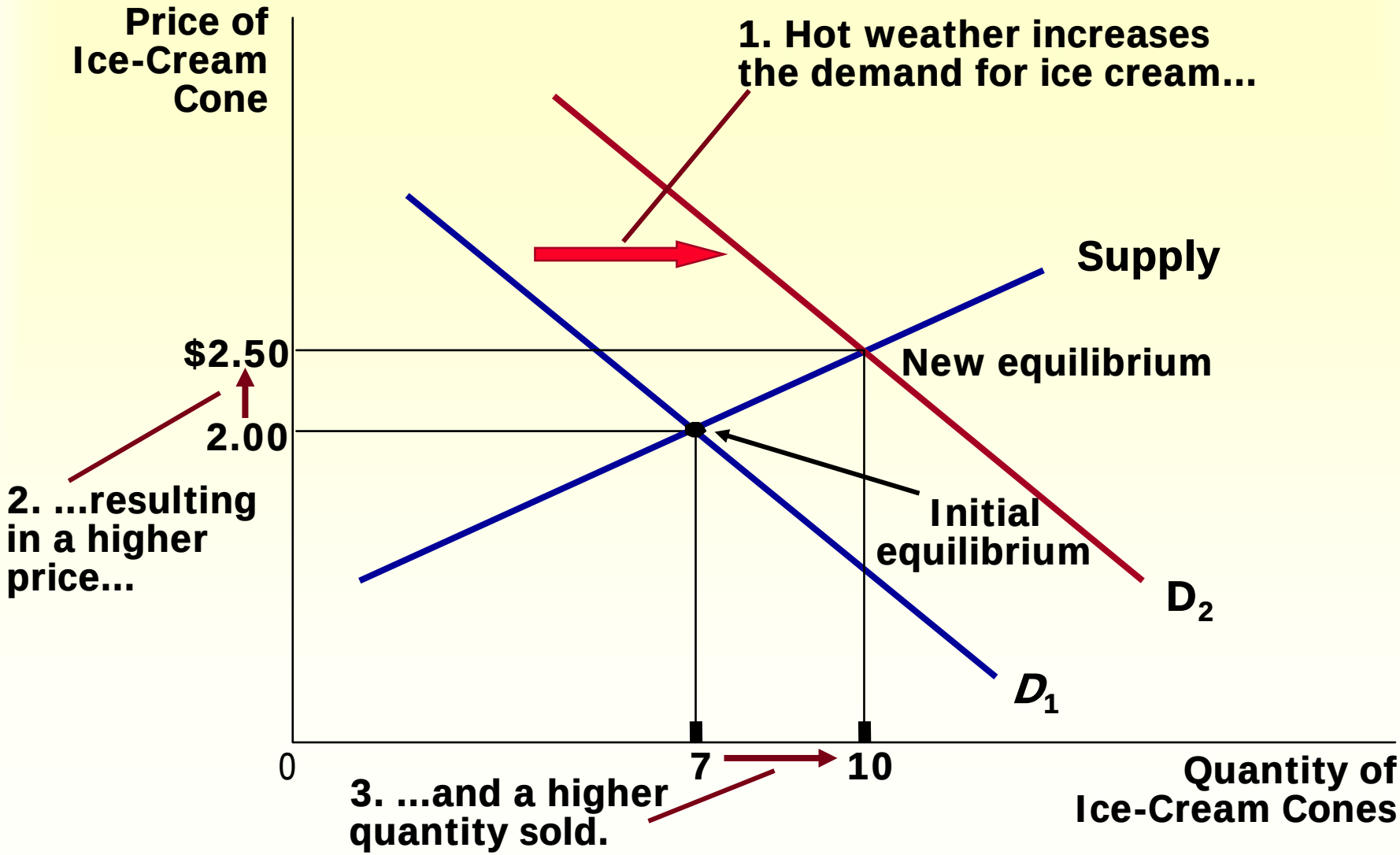
How an Increase in Demand Affects the Equilibrium



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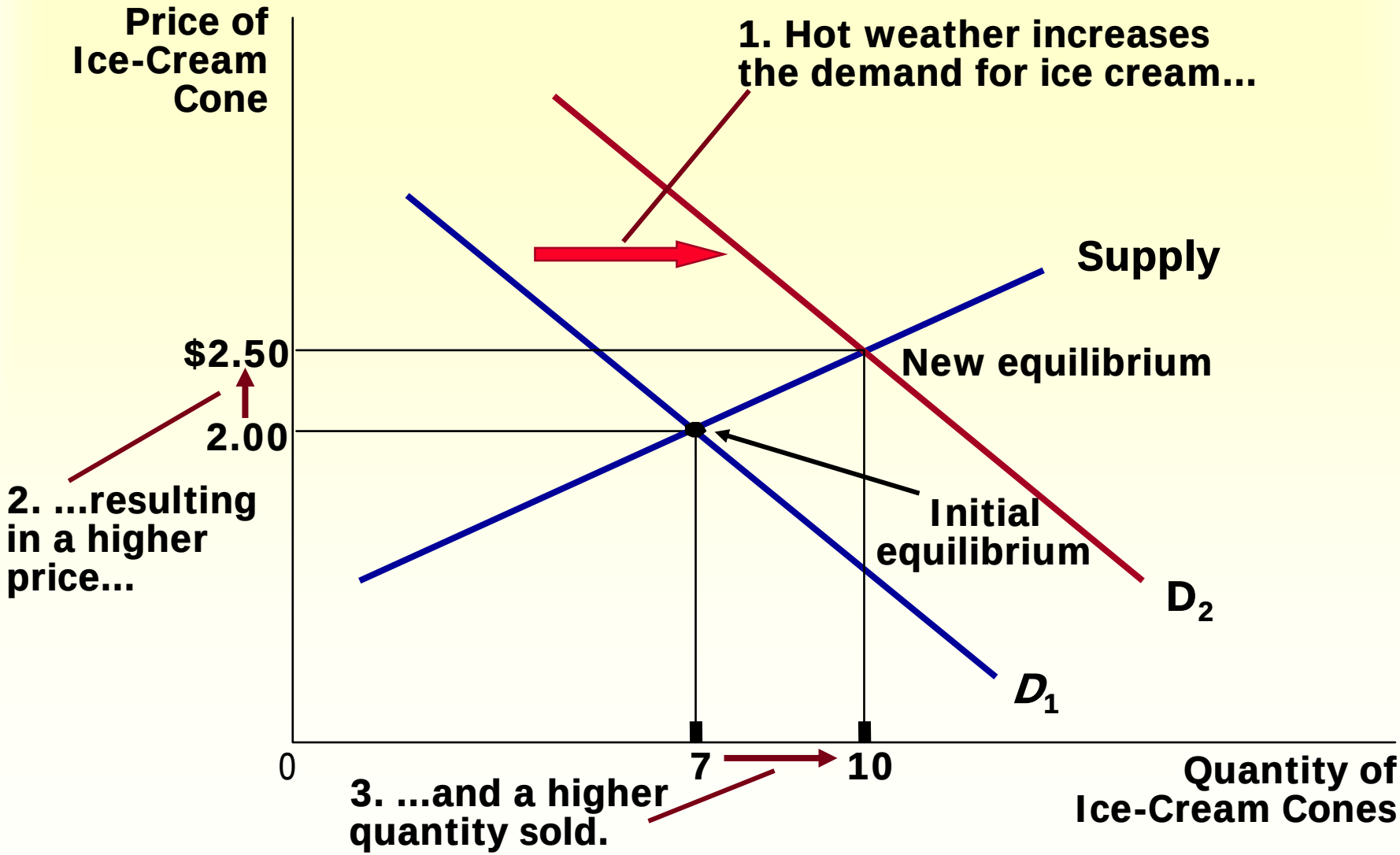
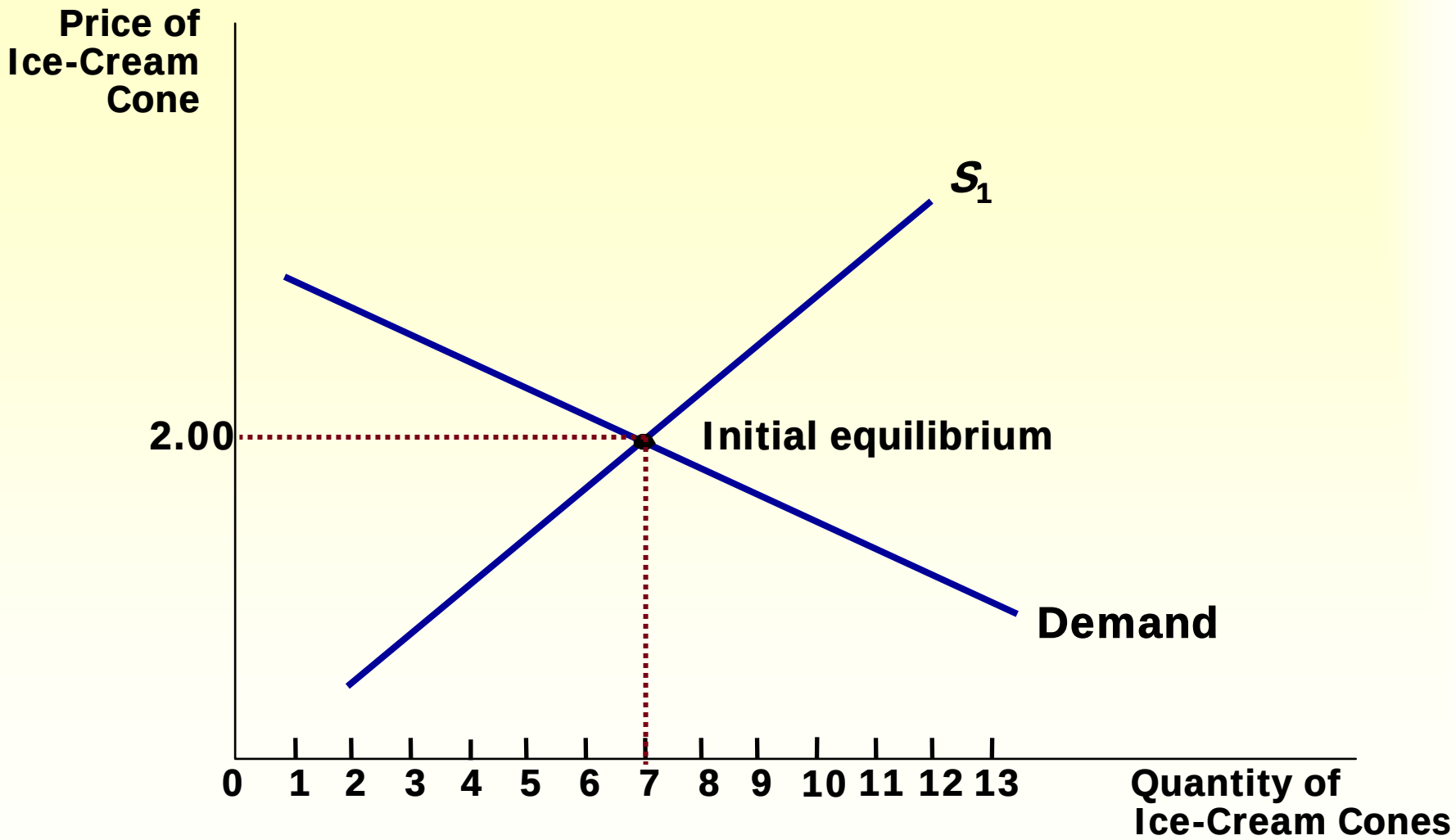
How an Increase in Demand Affects the Equilibrium



How a Decrease in Supply Affects the Equilibrium



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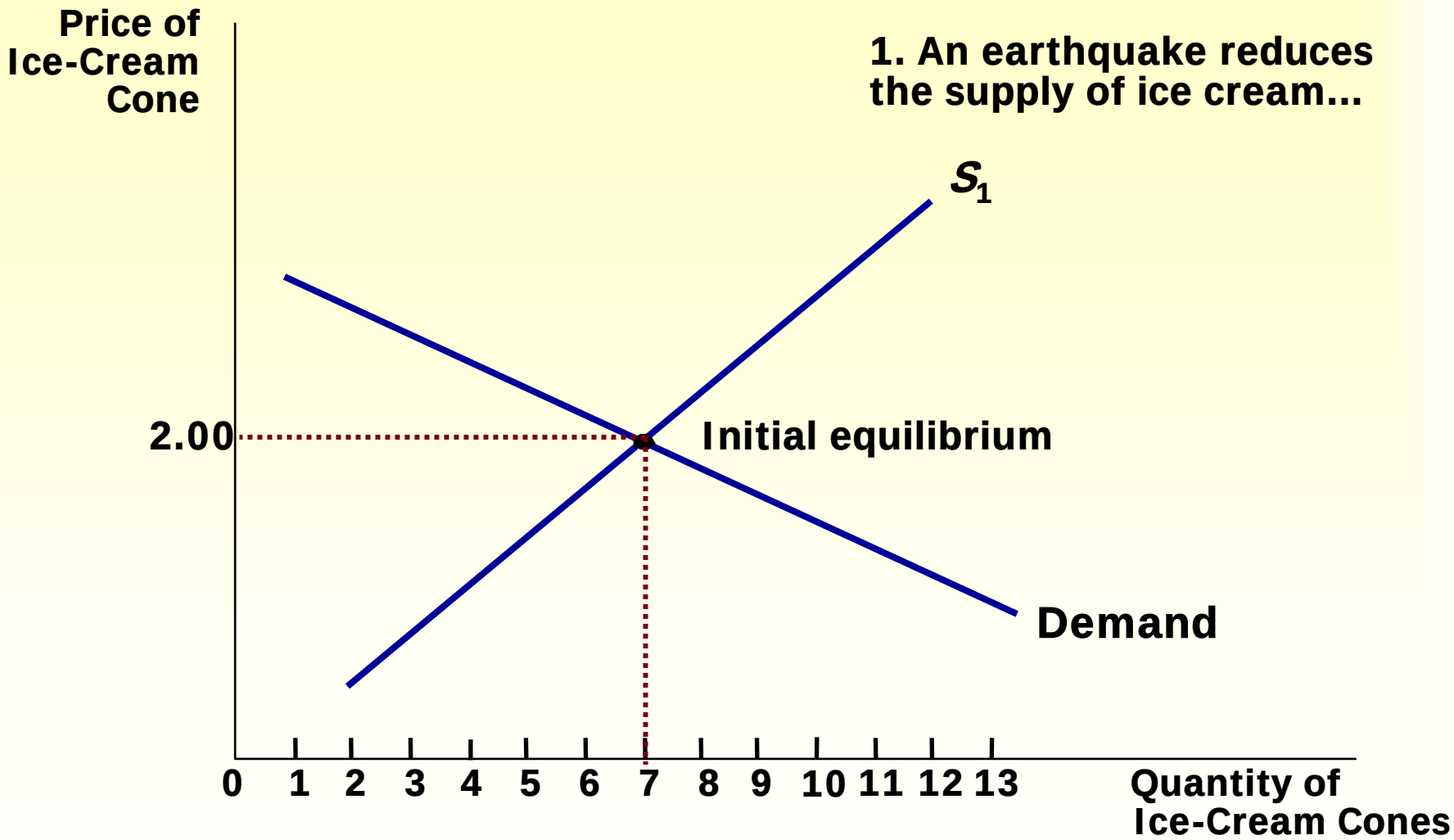
How a Decrease in Supply Affects the Equilibrium



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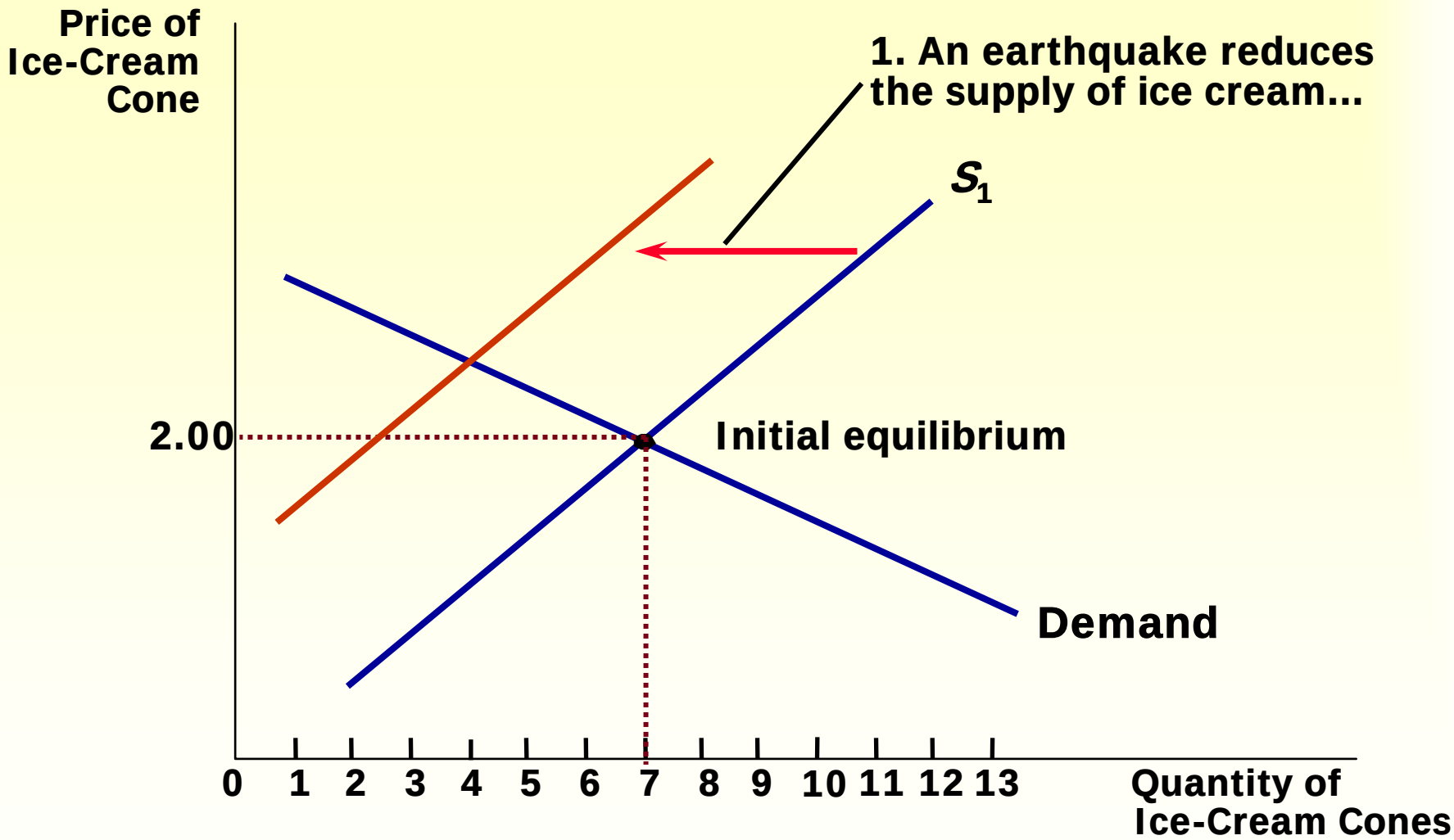
How a Decrease in Supply Affects the Equilibrium



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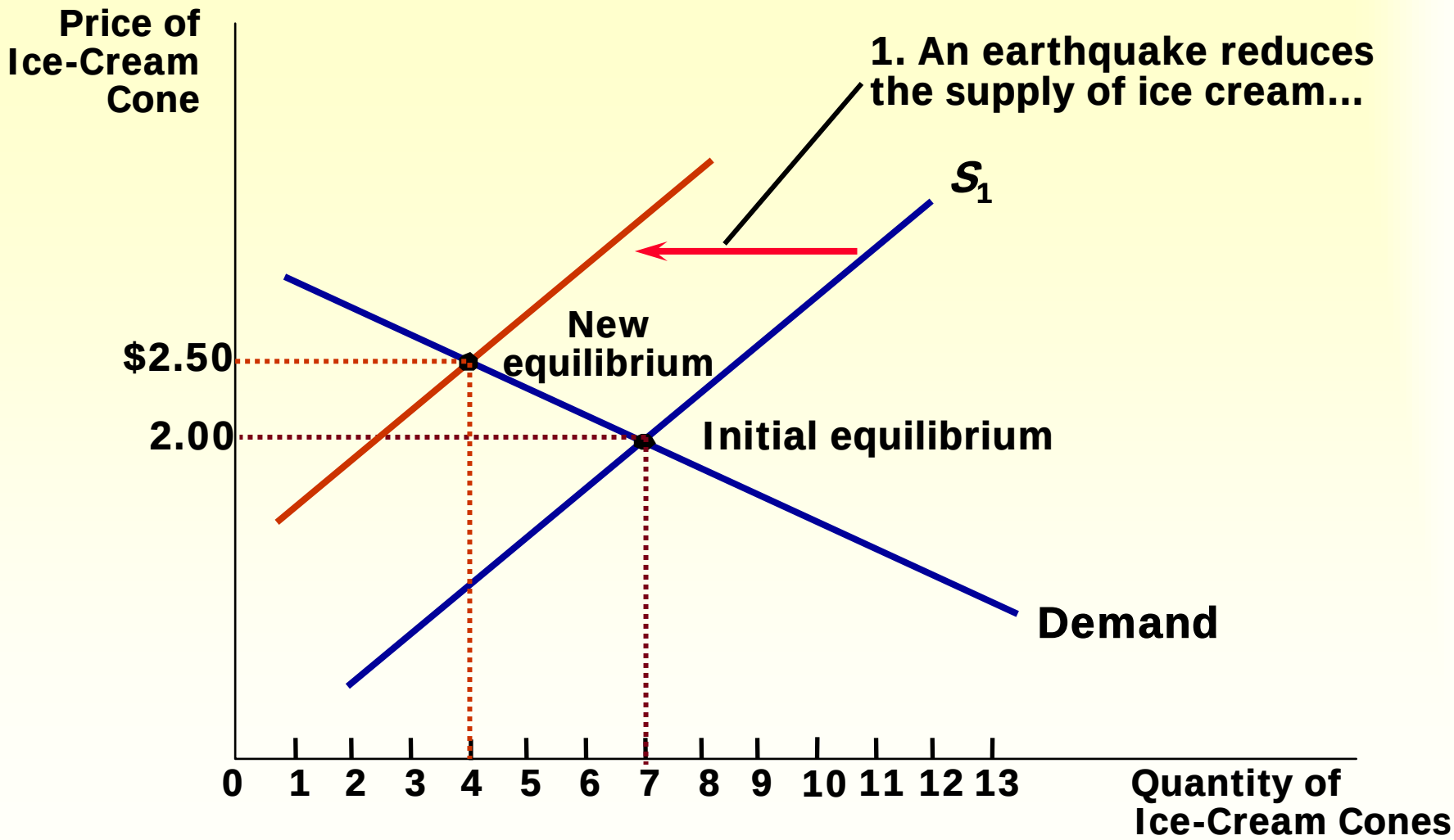
How a Decrease in Supply Affects the Equilibrium



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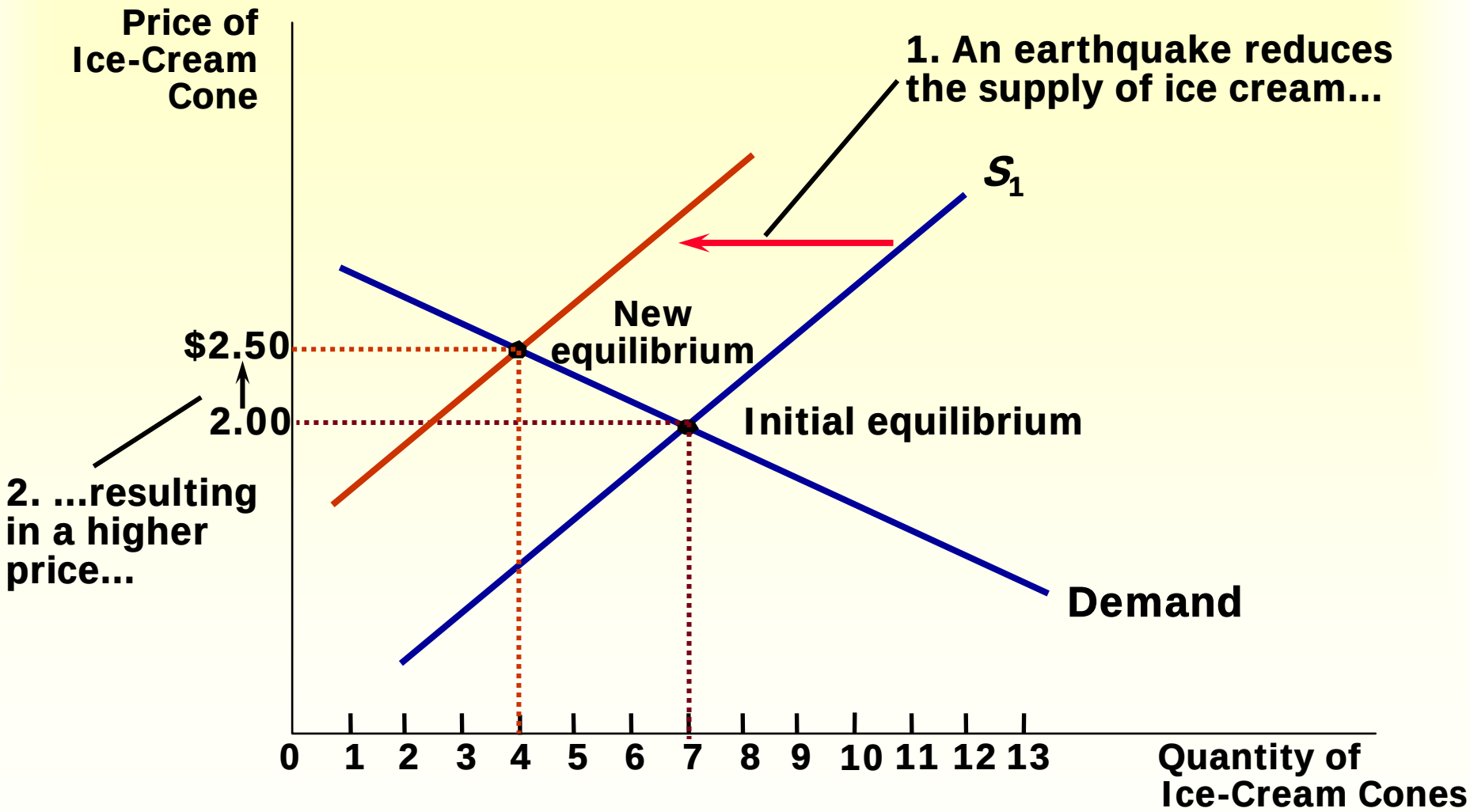
How a Decrease in Supply Affects the Equilibrium



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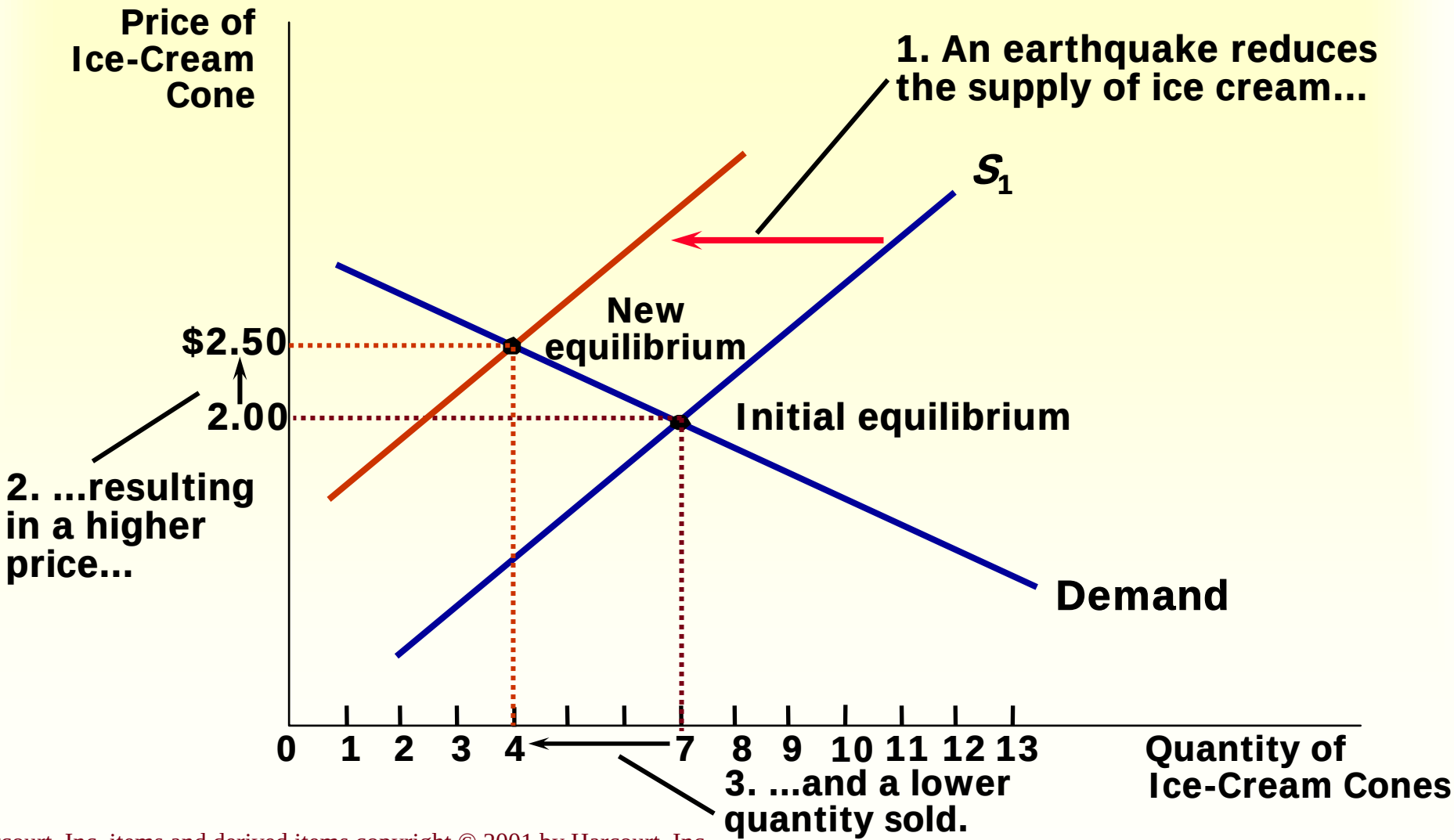

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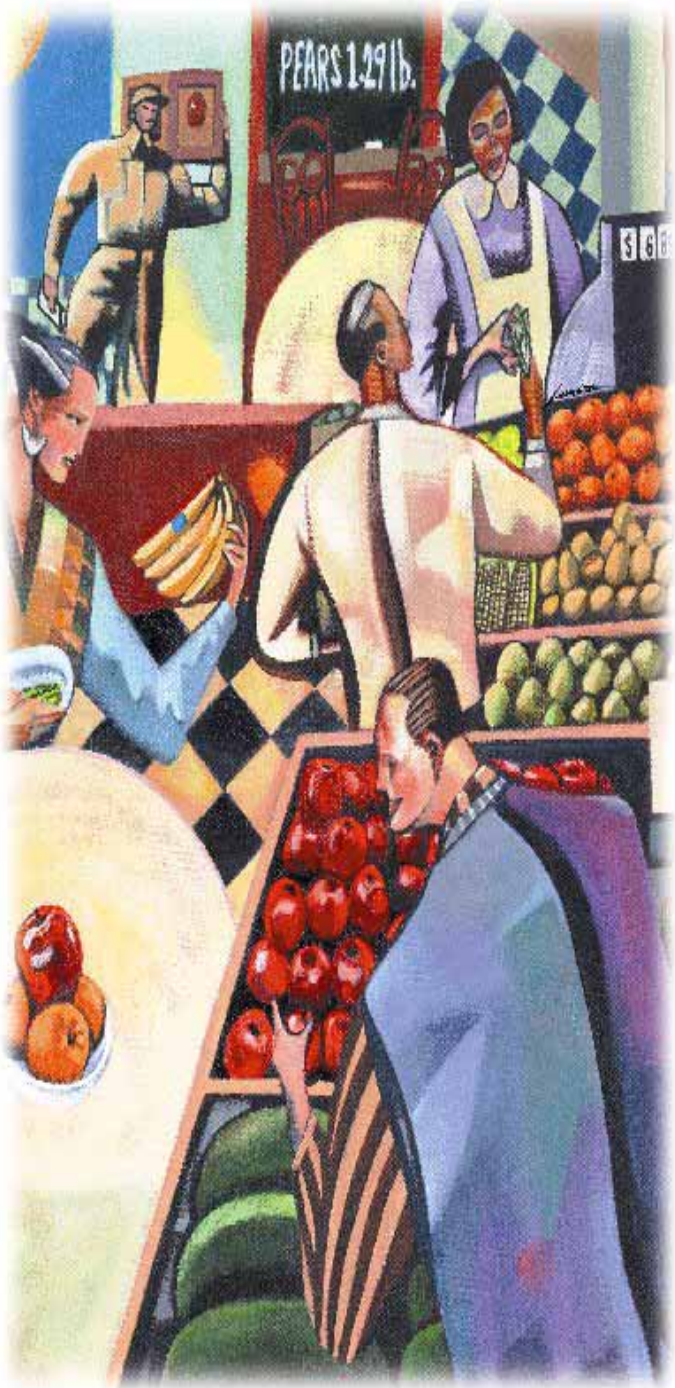

Elasticity and Its Application

Chapter 5

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Elasticity . . .

- … is a measure of how much buyers and sellers respond to changes in market conditions

- … allows us to analyze supply and demand with greater precision.

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Price Elasticity of Demand

- **Price elasticity of demand** is the percentage change in quantity demanded given a percent change in the price.
- It is a measure of how much the quantity demanded of a good responds to a change in the price of that good.

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Determinants of Price Elasticity of Demand

- *Necessities versus Luxuries*
- *Availability of Close Substitutes*
- *Definition of the Market*
- *Time Horizon*

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Determinants of Price Elasticity of Demand

Demand tends to be more elastic :

- **if the good is a luxury.**
- **the longer the time period.**
- **the larger the number of close substitutes.**
- **the more narrowly defined the market.**

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Computing the Price Elasticity of Demand

The price elasticity of demand is computed as the percentage change in the quantity demanded divided by the percentage change in price.

$$\text{Price Elasticity of Demand} = \frac{\text{Percentage Change in Quantity Demanded}}{\text{Percentage Change in Price}}$$

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Computing the Price Elasticity of Demand

$$\textit{Price elasticity of demand} = \frac{\textit{Percentage change in quatity demanded}}{\textit{Percentage change in price}}$$

Example: If the price of an ice cream cone increases from $2.00 to $2.20 and the amount you buy falls from 10 to 8 cones then your elasticity of demand would be calculated as:

$$\frac{\frac{(10-8)}{10}\times 100}{\frac{(2.20-2.00)}{2.00}\times 100} = \frac{20 \text{ percent}}{10 \text{ percent}} = 2$$

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Computing the Price Elasticity of Demand Using the Midpoint Formula

The **midpoint formula** is preferable when calculating the price elasticity of demand because it gives the same answer regardless of the direction of the change.

$$\text{Price Elasticity of Demand} = \frac{(Q_2 - Q_1) / [(Q_2 + Q_1) / 2]}{(P_2 - P_1) / [(P_2 + P_1) / 2]}$$

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Computing the Price Elasticity of Demand

$$\text{Price Elasticity of Demand} = \frac{(Q_2 - Q_1) / [(Q_2 + Q_1) / 2]}{(P_2 - P_1) / [(P_2 + P_1) / 2]}$$

Example: If the price of an ice cream cone increases from $2.00 to $2.20 and the amount you buy falls from 10 to 8 cones the your elasticity of demand, using the midpoint formula, would be calculated as:

$$\frac{\frac{(10-8)}{(10+8)/2}}{\frac{(2.20-2.00)}{(2.00+2.20)/2}} = \frac{22 \ percent}{9.5 \ percent} = 2.32$$

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Ranges of Elasticity

Inelastic Demand

- **Quantity demanded *does not respond* strongly to price changes.**
- **Price elasticity of demand is *less than* one.**

Elastic Demand

- **Quantity demanded *responds strongly* to changes in price.**
- **Price elasticity of demand is *greater than* one.**

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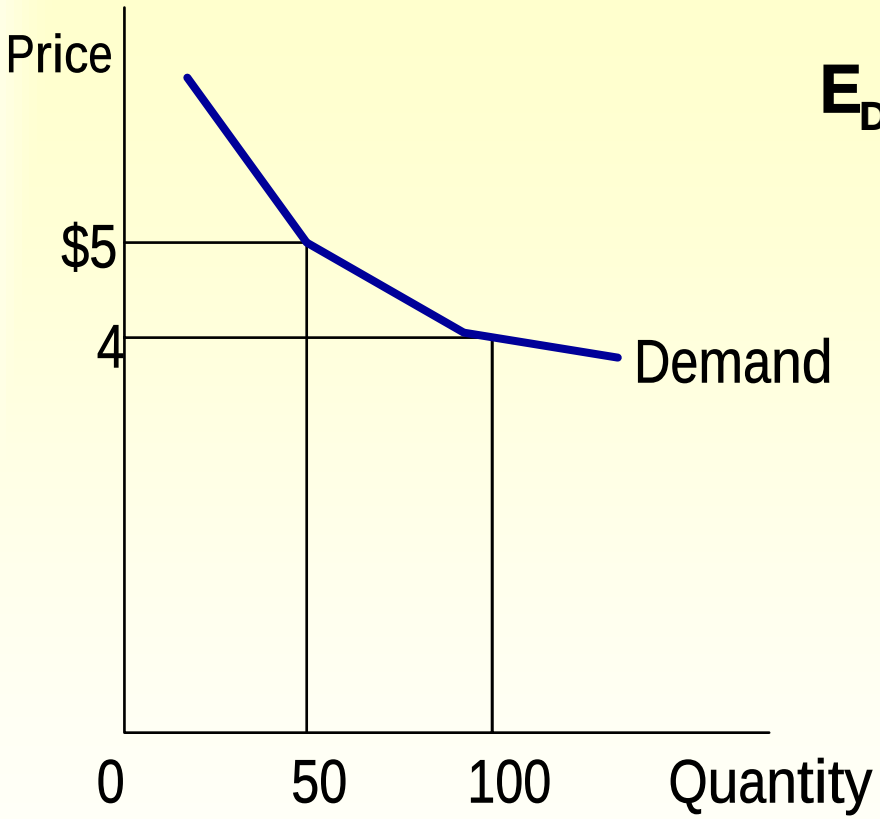
Computing the Price Elasticity of Demand



$$E_D = \frac{(100-50)/(100+50)/2}{(4.00-5.00)/(4.00+5.00)/2}$$

$$= \frac{67\ \text{percent}}{-22\ \text{percent}} = -3$$

Demand is price elastic

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Ranges of Elasticity

- ***Perfectly Inelastic***

Quantity demanded does not respond to price changes.

- ***Perfectly Elastic***

Quantity demanded changes infinitely with any change in price.

- ***Unit Elastic***

Quantity demanded changes by the same percentage as the price.

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A Variety of Demand Curves

Because the price elasticity of demand measures how much quantity demanded responds to the price, it is closely related to the slope of the demand curve.

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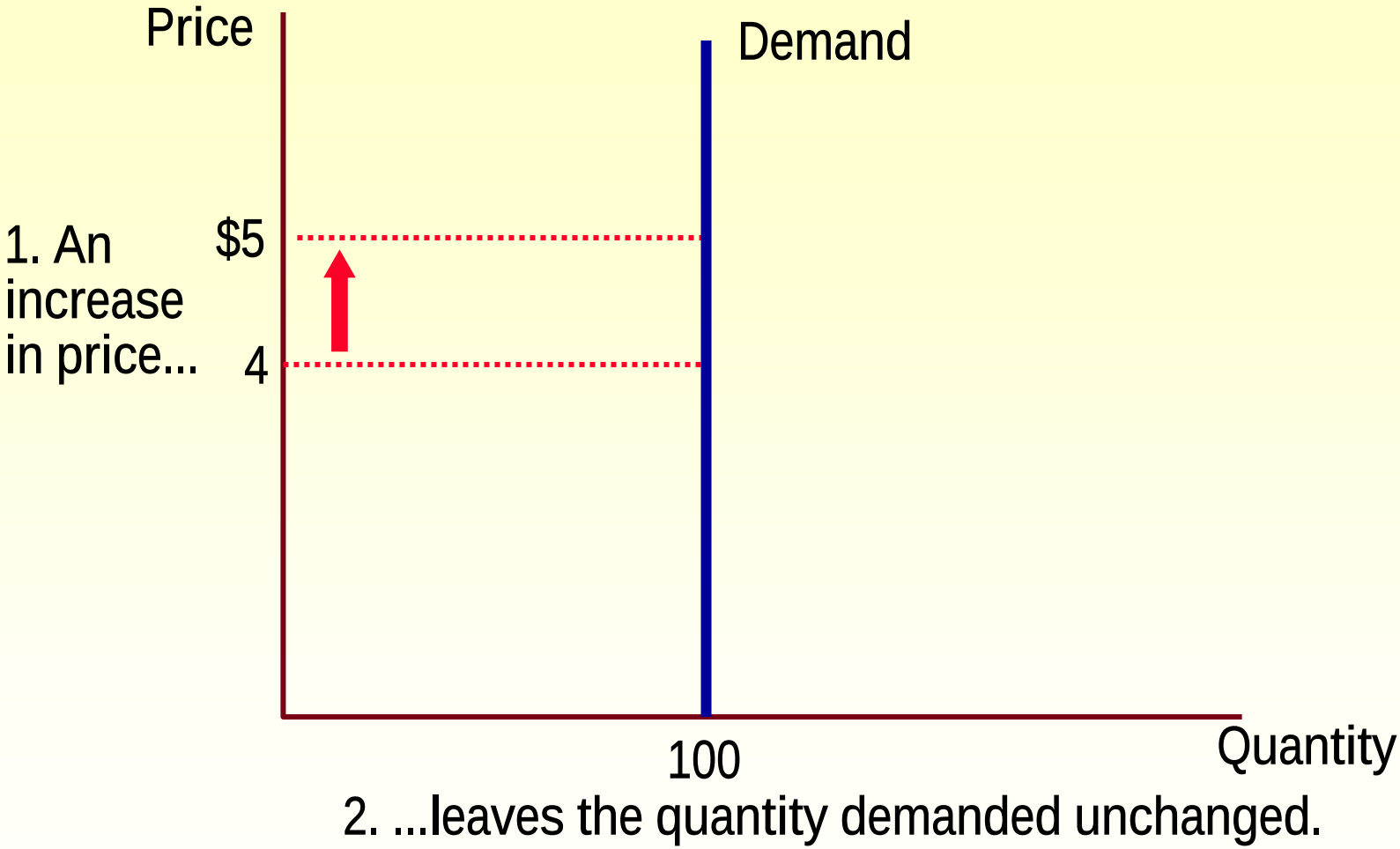
Perfectly Inelastic Demand
- Elasticity equals 0



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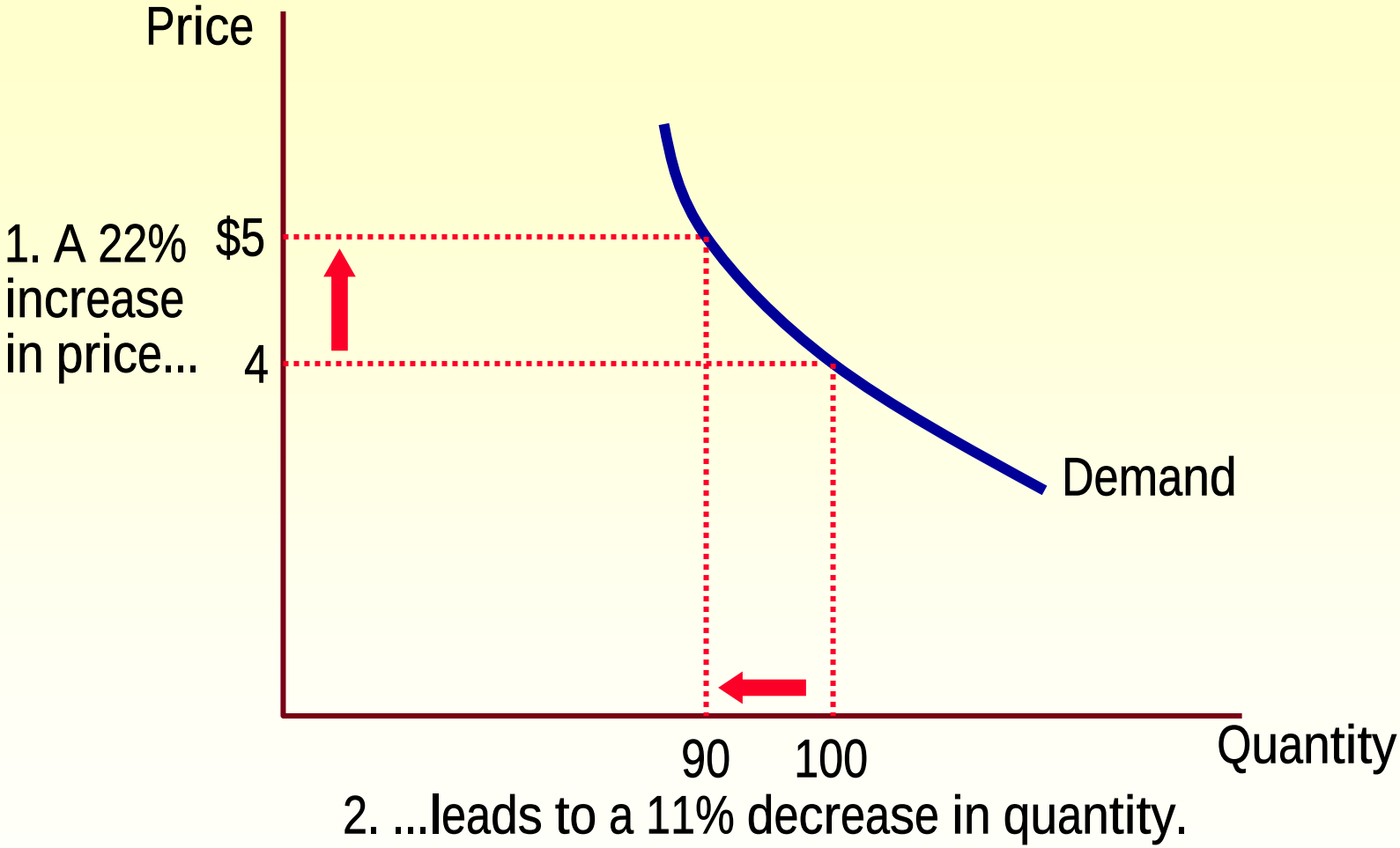
Inelastic Demand
- Elasticity is less than 1



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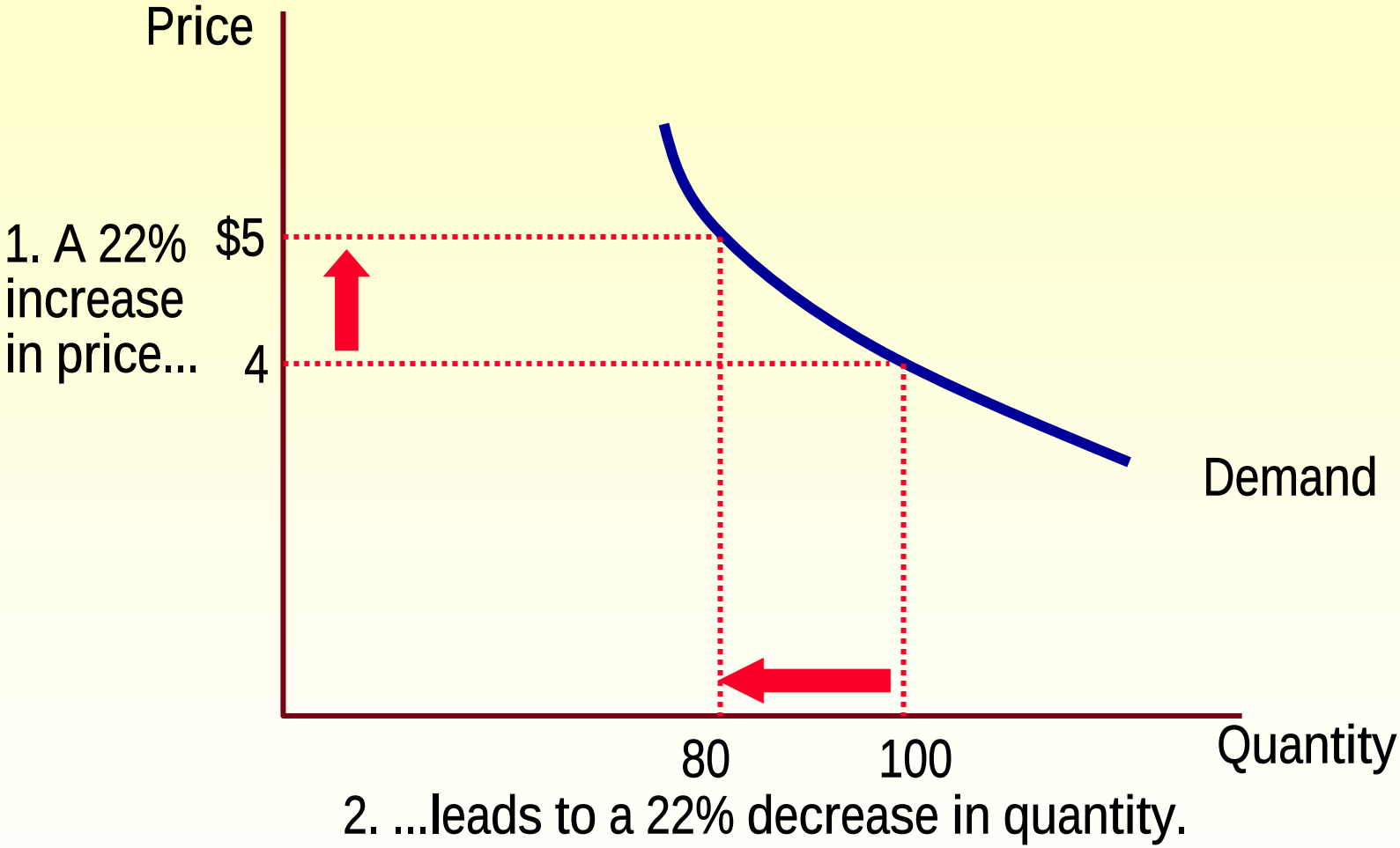
Unit Elastic Demand
- Elasticity equals 1



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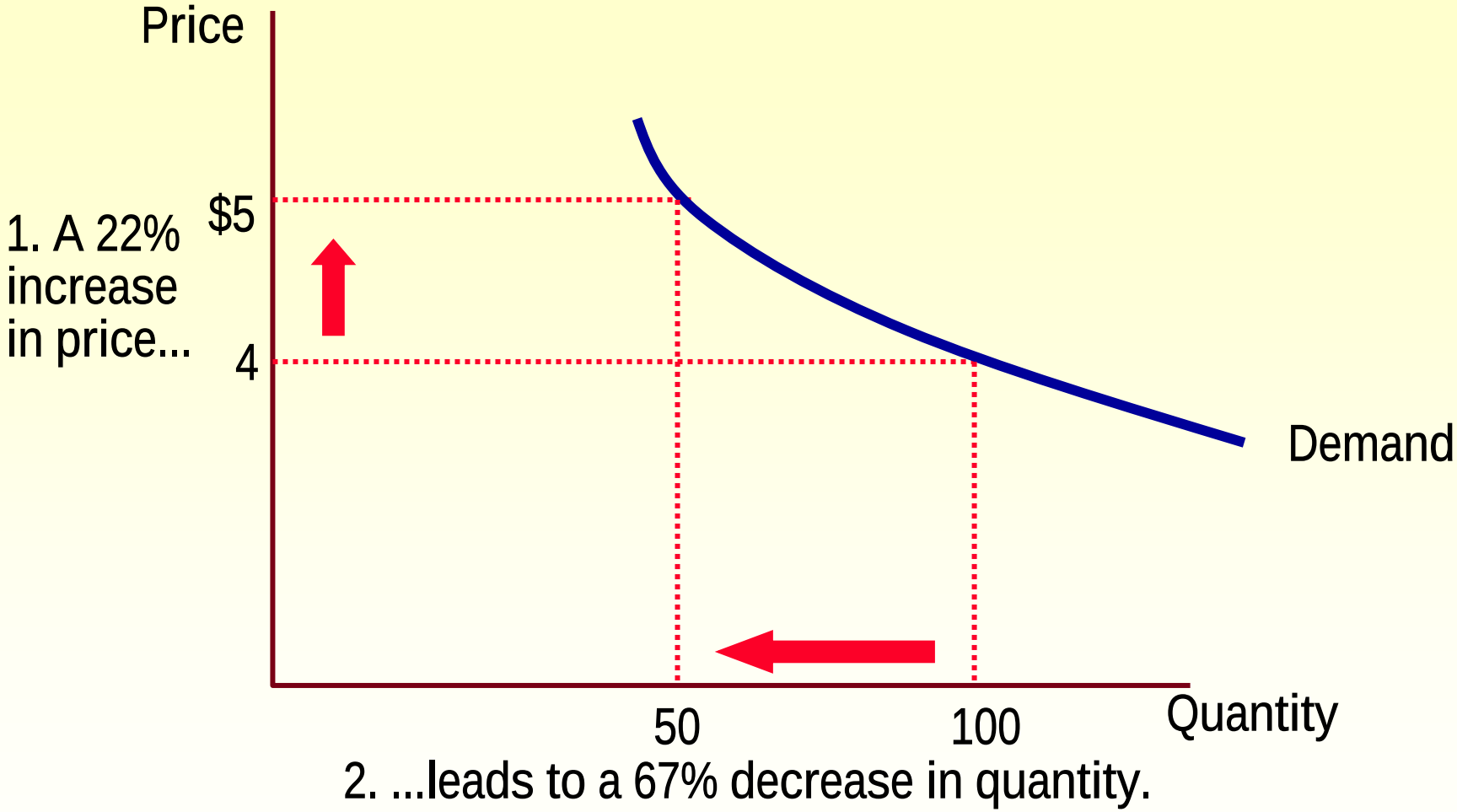
Elastic Demand
- Elasticity is greater than 1



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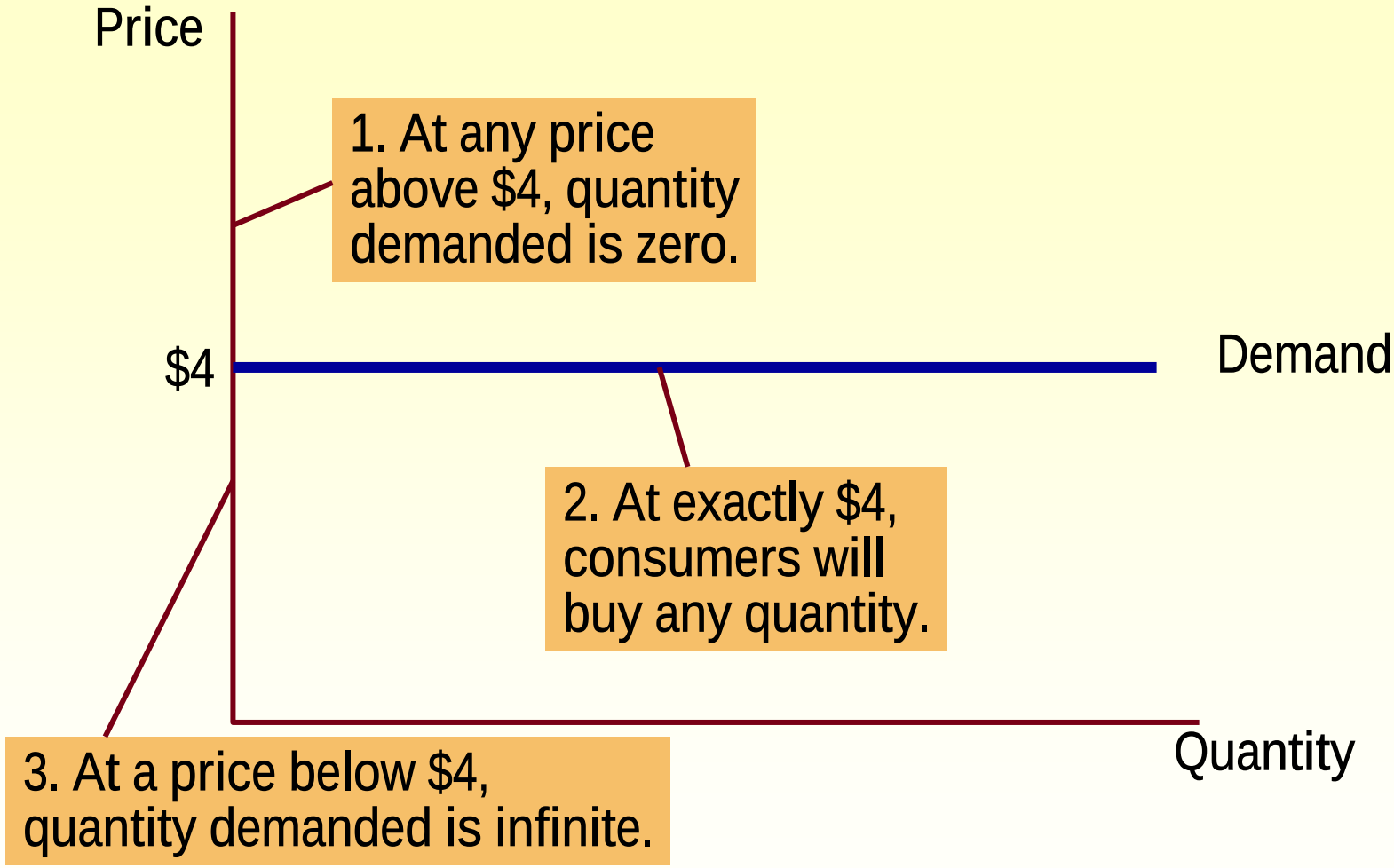
Perfectly Elastic Demand
- Elasticity equals infinity



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Elasticity and Total Revenue

- **Total revenue** is the amount paid by buyers and received by sellers of a good.
- Computed as the price of the good times the quantity sold.

$$TR = P \times Q$$

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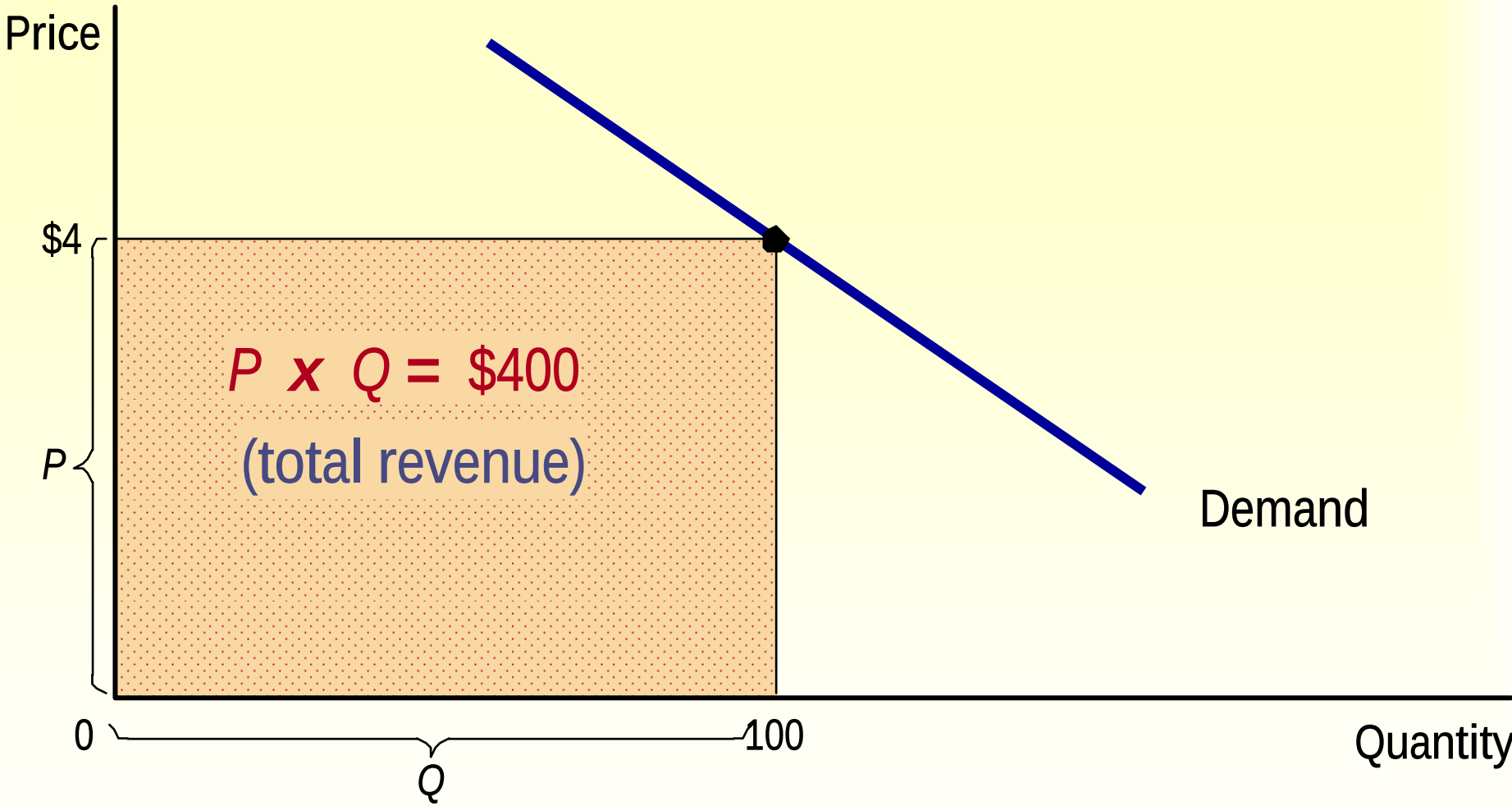
Elasticity and Total Revenue



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Elasticity and Total Revenue

With an inelastic demand curve, an increase in price leads to a decrease in quantity that is proportionately smaller. Thus, total revenue increases.

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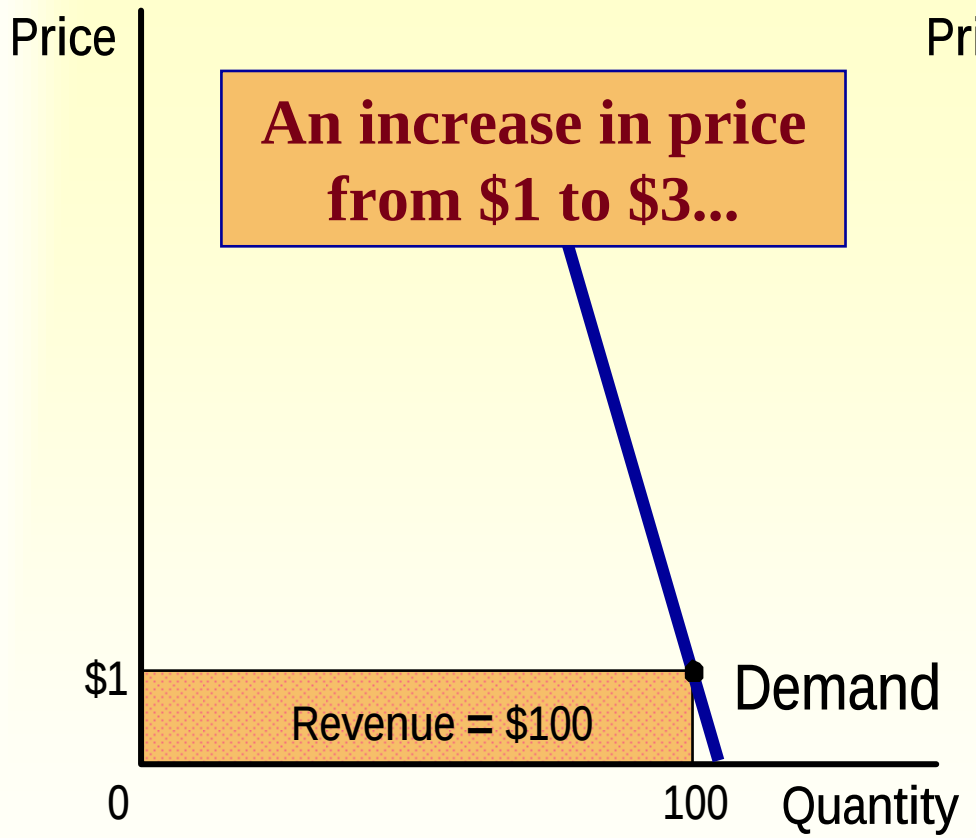
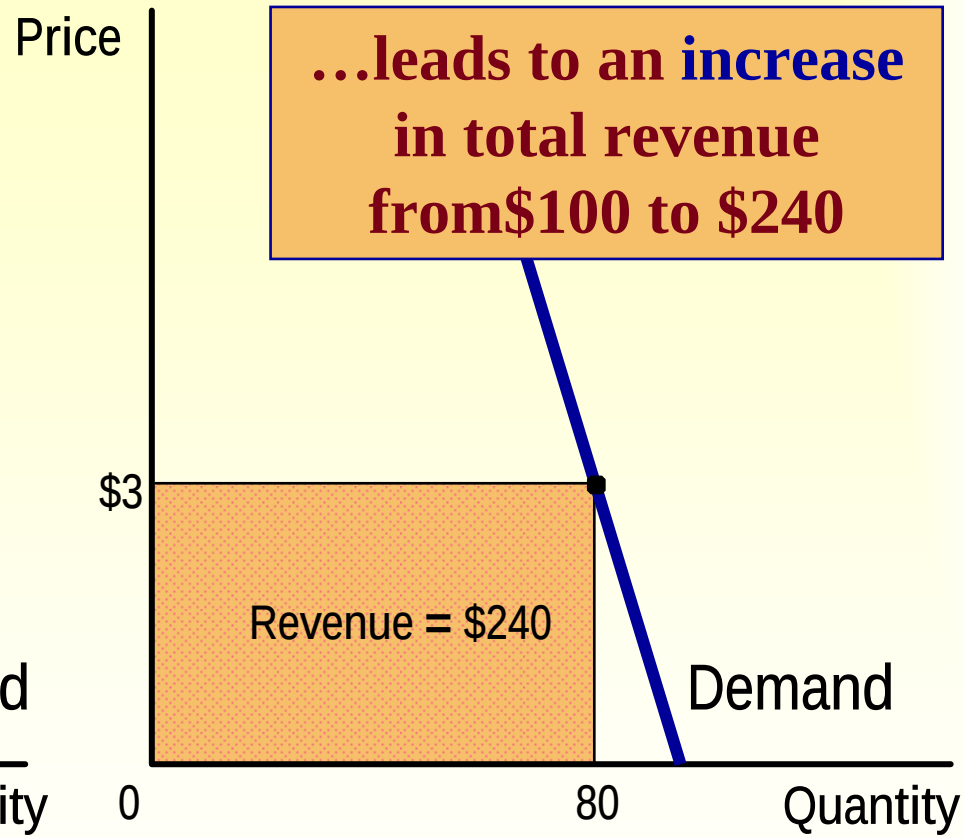
Elasticity and Total Revenue: Inelastic Demand





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Elasticity and Total Revenue

With an elastic demand curve, an increase in the price leads to a decrease in quantity demanded that is proportionately larger. Thus, total revenue decreases.

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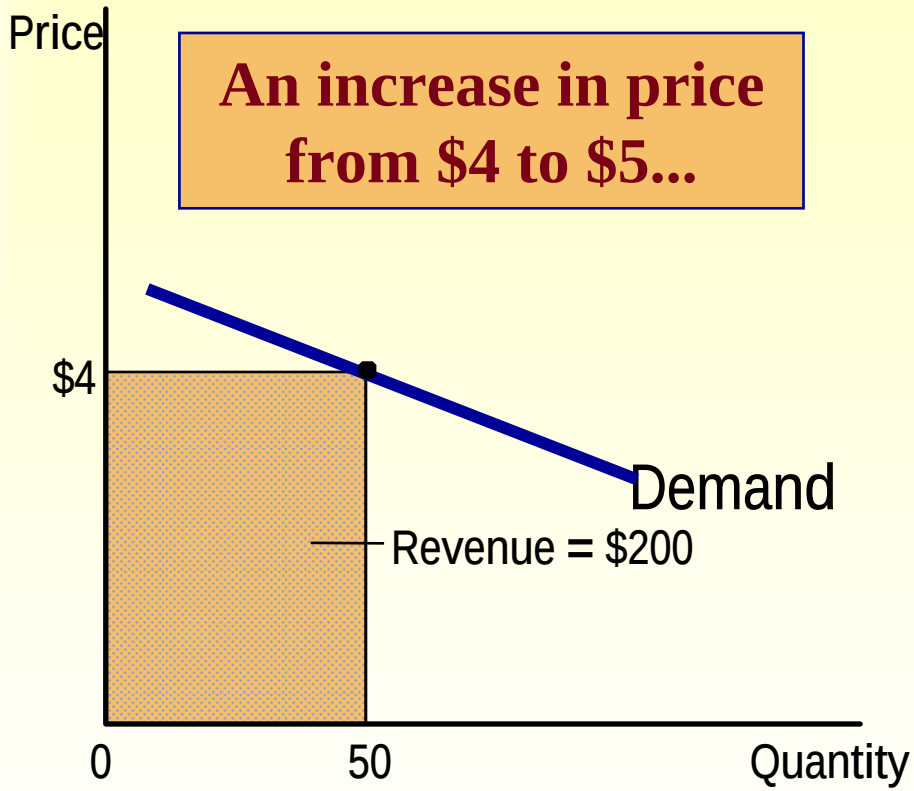
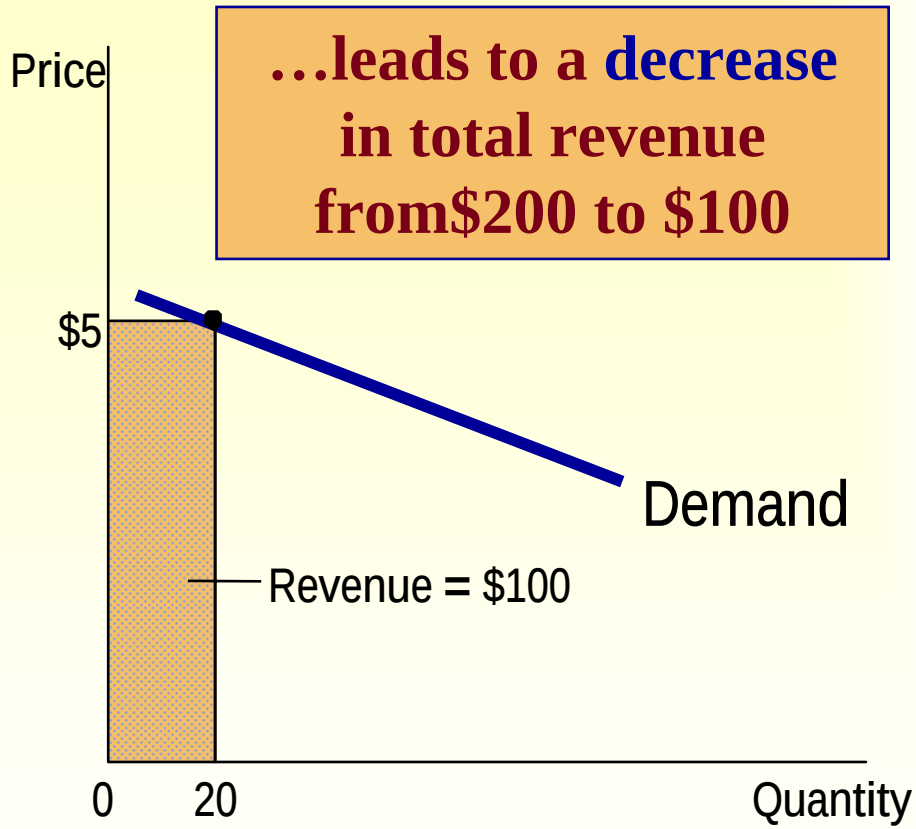
Elasticity and Total Revenue: Elastic Demand





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Computing the Elasticity of a Linear Demand Curve

Price	Quantity	Total Revenue (Price x Quantity)	Percent Change in Price	Percent Change in Quantity	Elasticity	Description
$0	14	$0	200%	15%	0.1	Inelastic
1	12	12	67	18	0.3	Inelastic
2	10	20	40	22	0.6	Inelastic
3	8	24	29	29	1	Unit elastic
4	6	24	22	40	1.8	elastic
5	4	20	18	67	3.7	elastic
6	2	12	15	200	13	elastic
7	0	0				

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Income Elasticity of Demand

- **Income elasticity of demand** measures how much the quantity demanded of a good responds to a change in consumers' income.
- It is computed as the percentage change in the quantity demanded divided by the percentage change in income.

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Computing Income Elasticity

$$\text{Income Elasticity of Demand} = \frac{\text{Percentage Change in Quantity Demanded}}{\text{Percentage Change in Income}}$$

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Income Elasticity
- Types of Goods -

- *Normal Goods*
- *Inferior Goods*
- **Higher income *raises* the quantity demanded for normal goods but *lowers* the quantity demanded for inferior goods.**

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Income Elasticity
- Types of Goods -

- **Goods consumers regard as necessities tend to be *income inelastic***
  Examples include food, fuel, clothing, utilities, and medical services.
- **Goods consumers regard as luxuries tend to be *income elastic*.**
  Examples include sports cars, furs, and expensive foods.

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Price Elasticity of Supply

- **Price elasticity of supply** is the percentage change in quantity supplied resulting from a percent change in price.
- It is a measure of how much the quantity supplied of a good responds to a change in the price of that good.

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Ranges of Elasticity

- **Perfectly Elastic**

$$E_s = \infty$$

- **Relatively Elastic**

$$E_s > 1$$

- **Unit Elastic**

$$E_s = 1$$

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Ranges of Elasticity

- **Relatively Inelastic**

$$E_S < 1$$

- **Perfectly Inelastic**

$$E_S = 0$$

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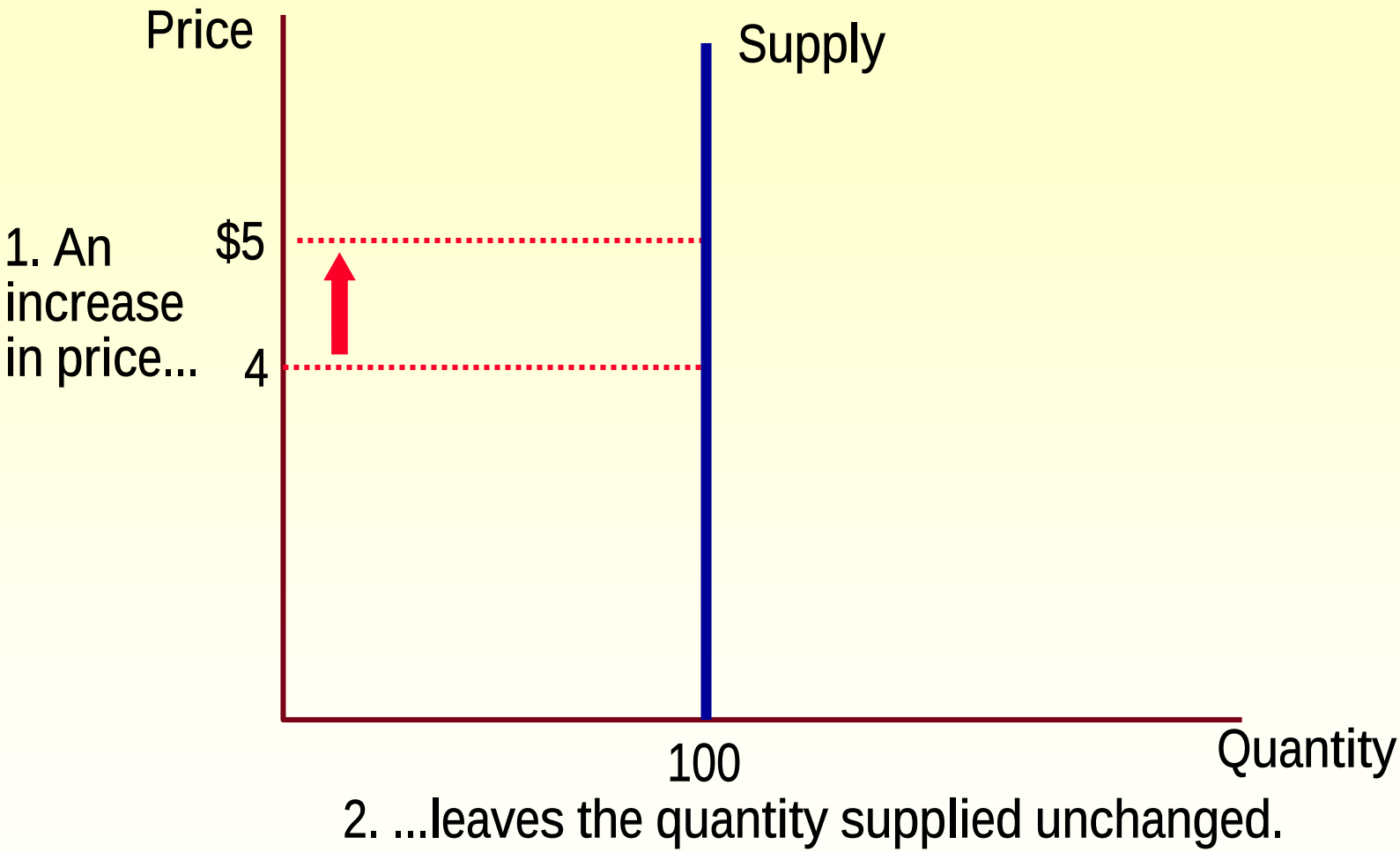
Perfectly Inelastic Supply
- Elasticity equals 0



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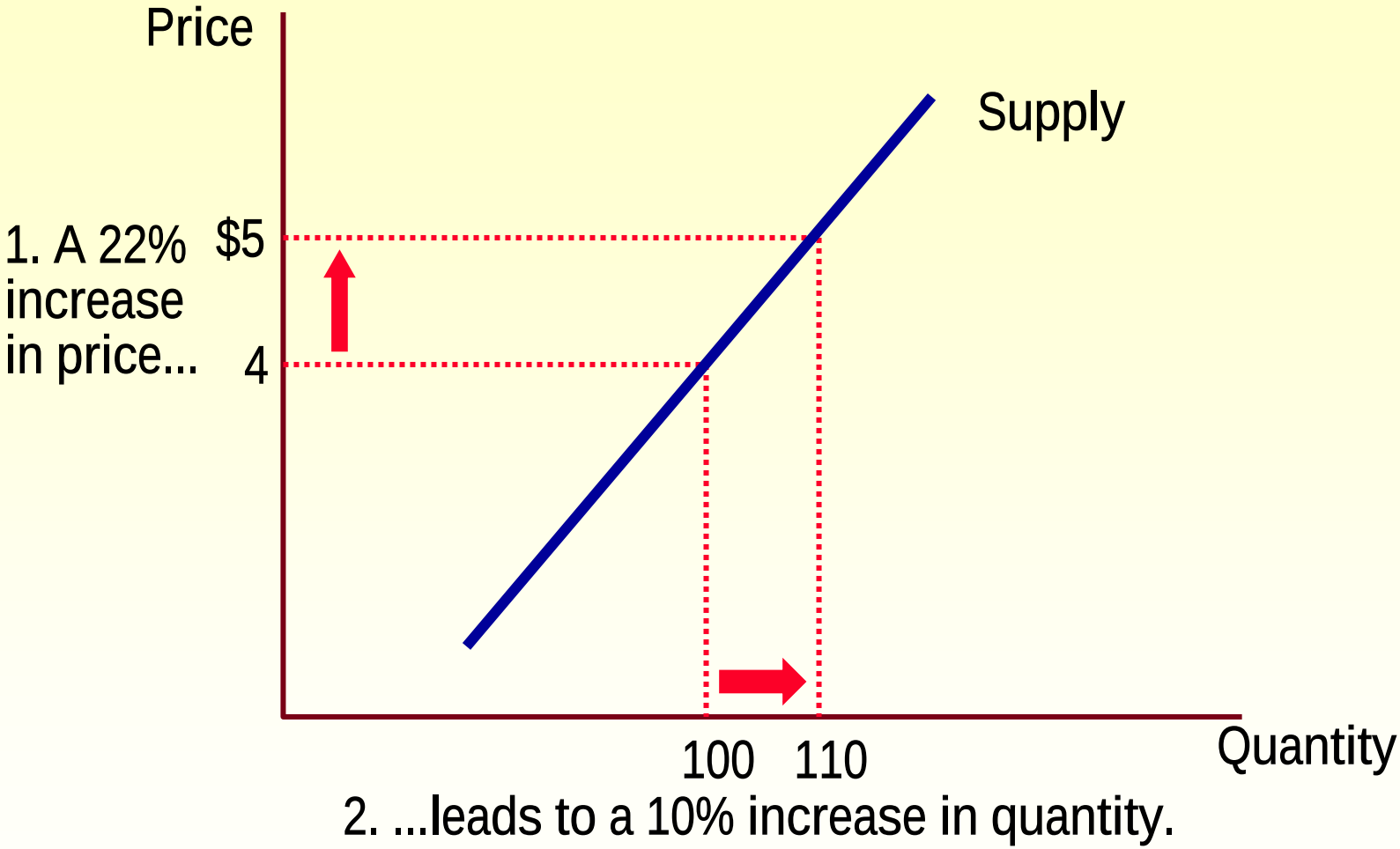
Inelastic Supply
- Elasticity is less than 1



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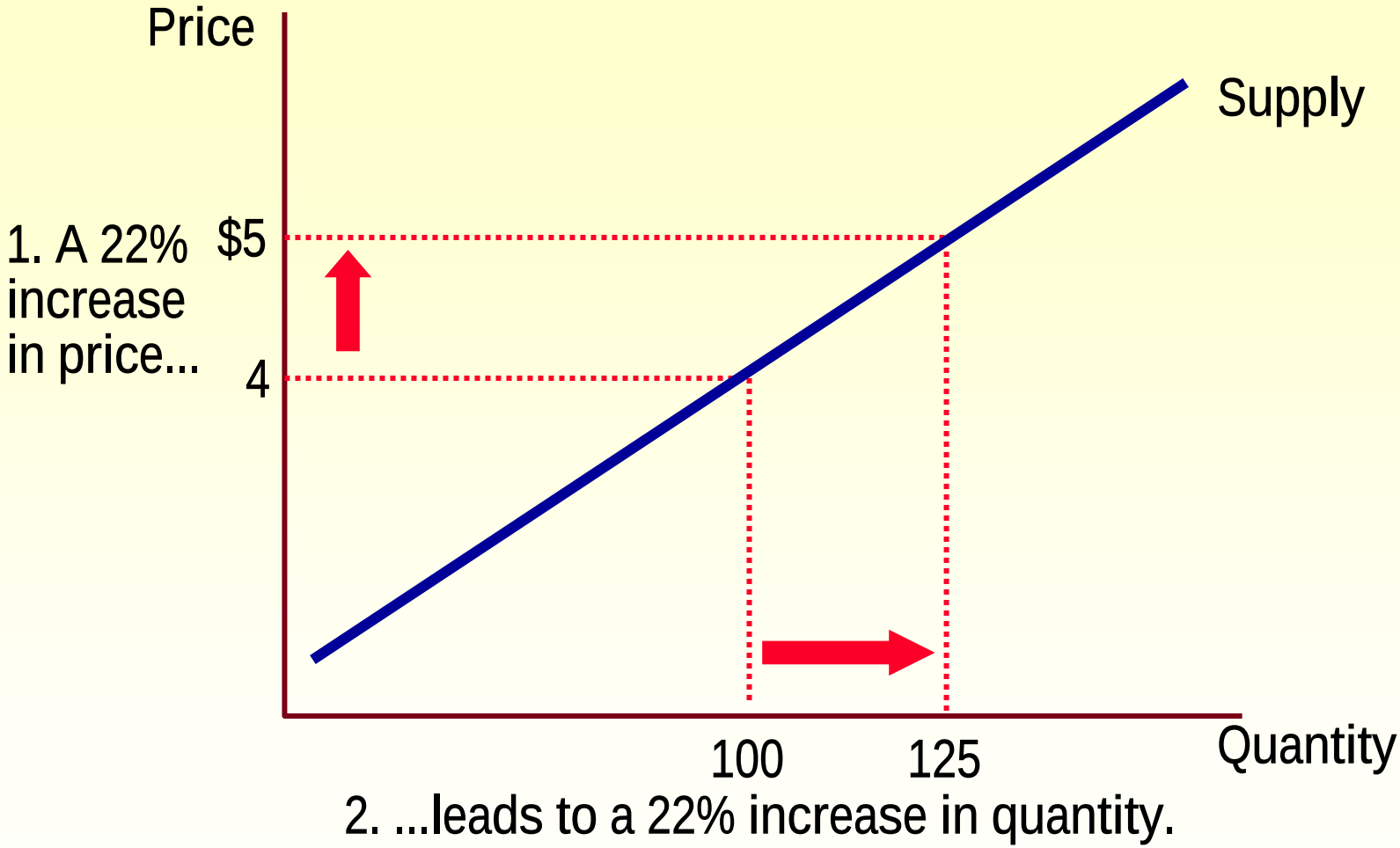
Unit Elastic Supply
- Elasticity equals 1



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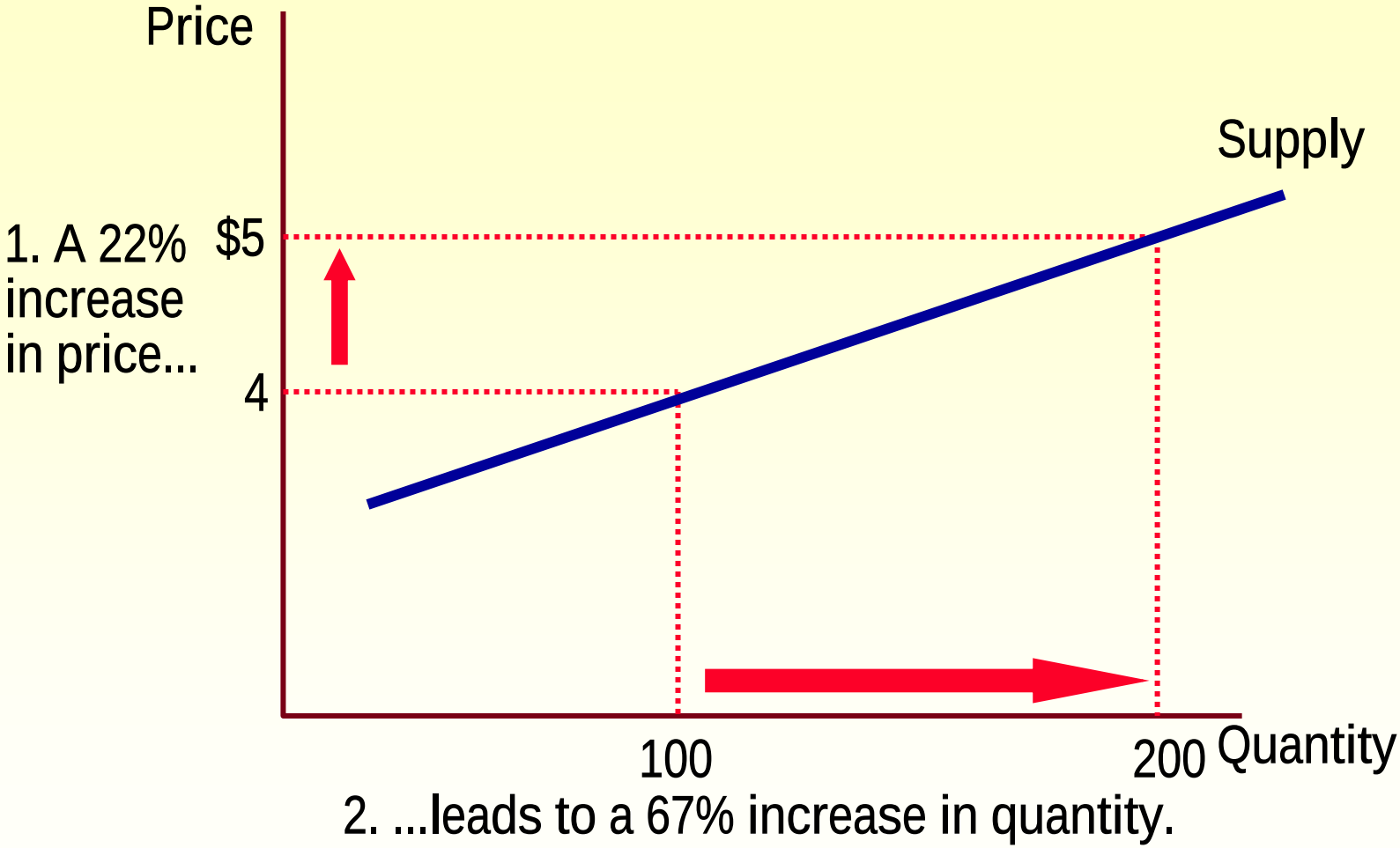
Elastic Supply
- Elasticity is greater than 1



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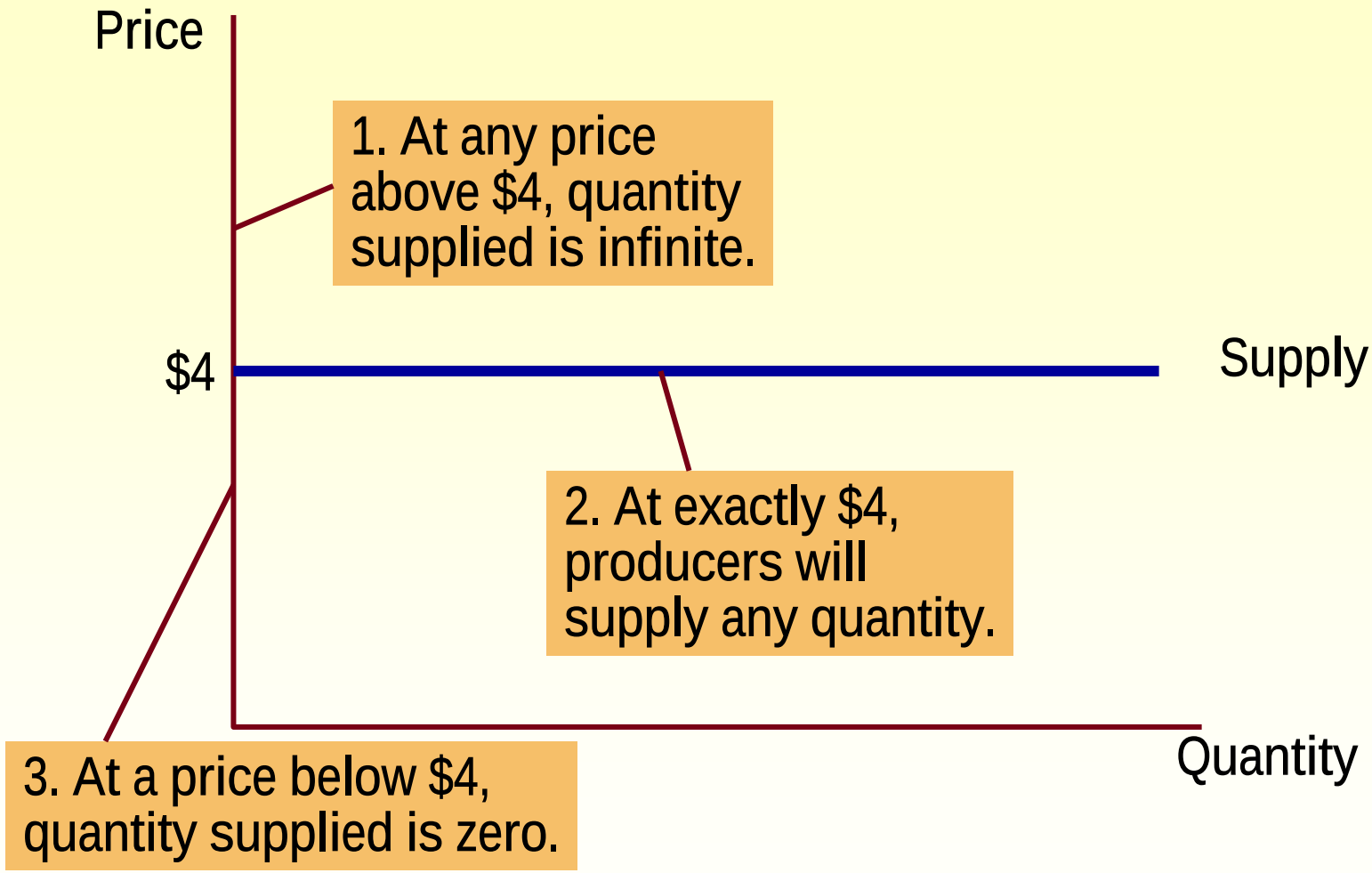
Perfectly Elastic Supply
- Elasticity equals infinity



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Determinants of Elasticity of Supply

- Ability of sellers to change the amount of the good they produce.
  - Beach-front land is inelastic.
  - Books, cars, or manufactured goods are elastic.
- Time period.
  - Supply is more elastic in the long run.

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Computing the Price Elasticity of Supply

The price elasticity of supply is computed as the percentage change in the quantity supplied divided by the percentage change in price.

$$\text{Elasticity of Supply} = \frac{\text{Percentage Change in Quantity Supplied}}{\text{Percentage Change in Price}}$$

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Application of Elasticity

- Can good news for farming be bad news for farmers?
- What happens to wheat farmers and the market for wheat when university agronomists discover a new wheat hybridthat is more productive than existing varieties?

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Application of Elasticity

- Examine whether the supply or demand curve shifts.
- Determine the direction of the shift of the curve.
- Use the supply-and-demand diagram to see how the market equilibrium changes.

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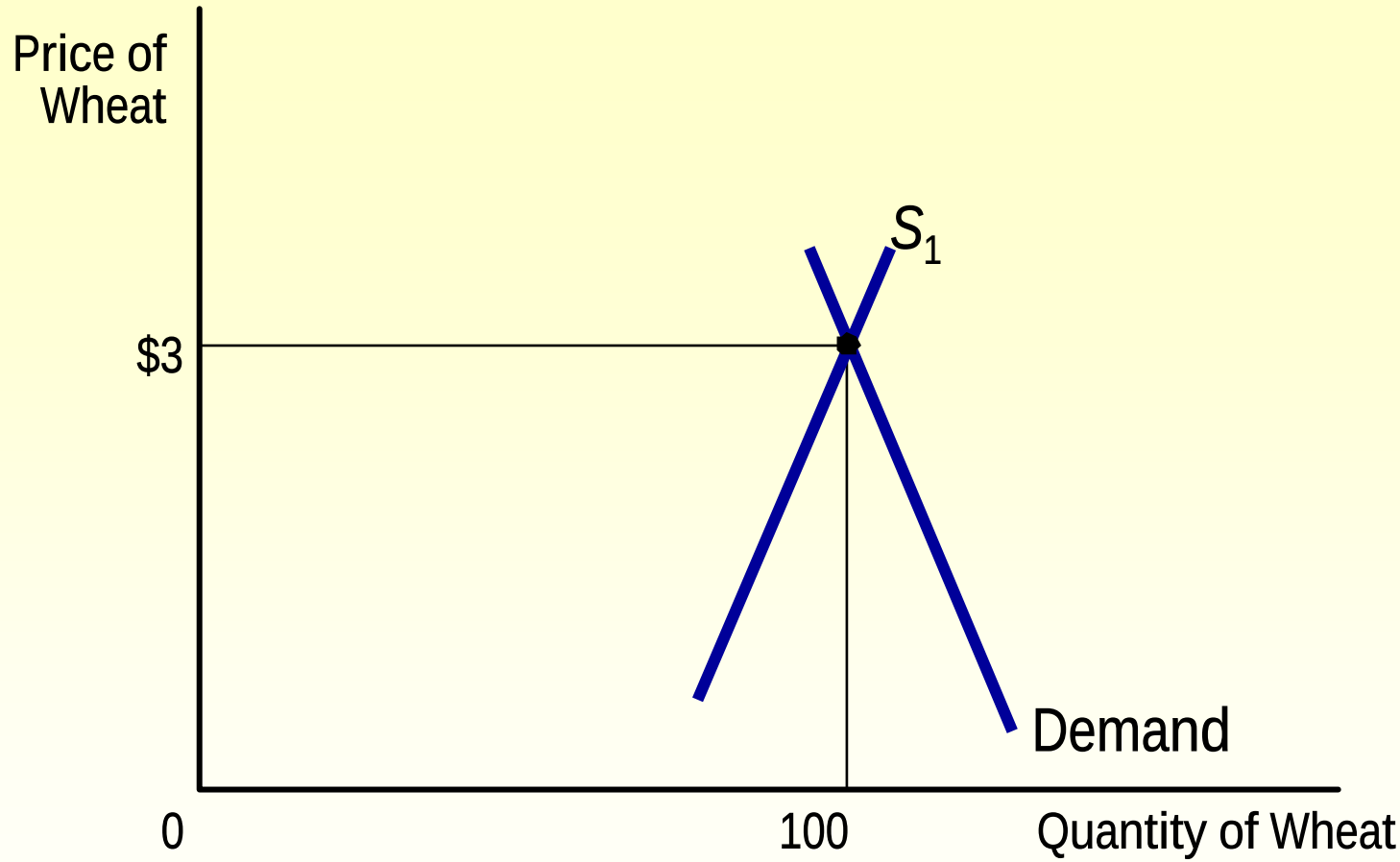
An Increase in Supply in the Market for Wheat



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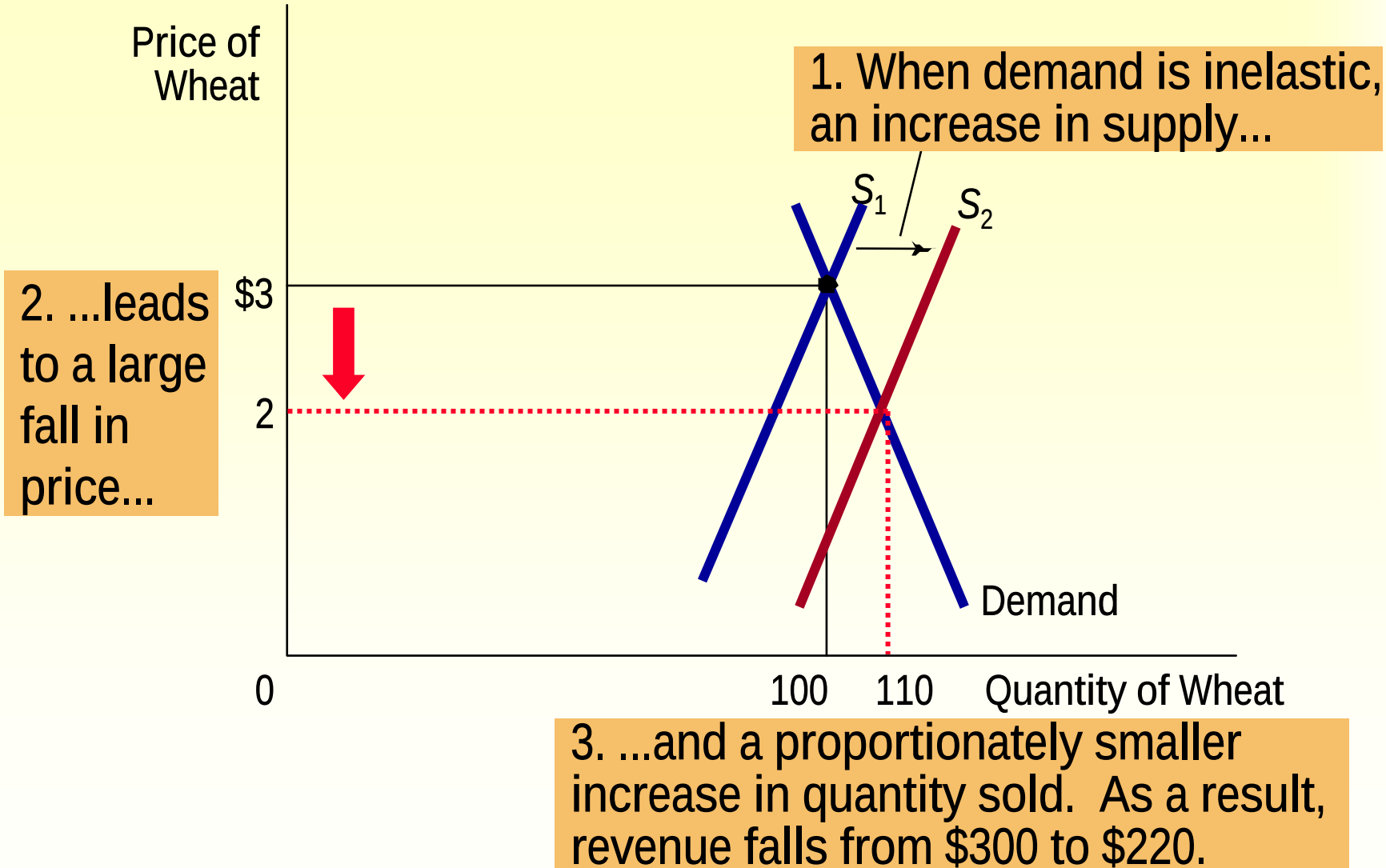
An Increase in Supply in the Market for Wheat



Compute Elasticity

$$E_D = \frac{100 - 110 \,/\, (100 + 110)/2}{3.00 - 2.00 \,/\, (3.00 + 2.00)/2}$$

$$= \frac{-0.095}{0.4} \approx -0.24$$

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Compute Elasticity

$$E_D = \frac{100 - 110 \,/\, (100 + 110)/2}{3.00 - 2.00 \,/\, (3.00 + 2.00)/2}$$

$$= \frac{-0.095}{0.4} \approx -0.24$$

Demand is inelastic

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Summary

- Price elasticity of demand measures how much the quantity demanded responds to changes in the price.
- If a demand curve is elastic, total revenue falls when the price rises.
- If it is inelastic, total revenue rises as the price rises.

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Summary

- The price elasticity of supply measures how much the quantity supplied responds to changes in the price.
- In most markets, supply is more elastic in the long run than in the short run.

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Graphical Review

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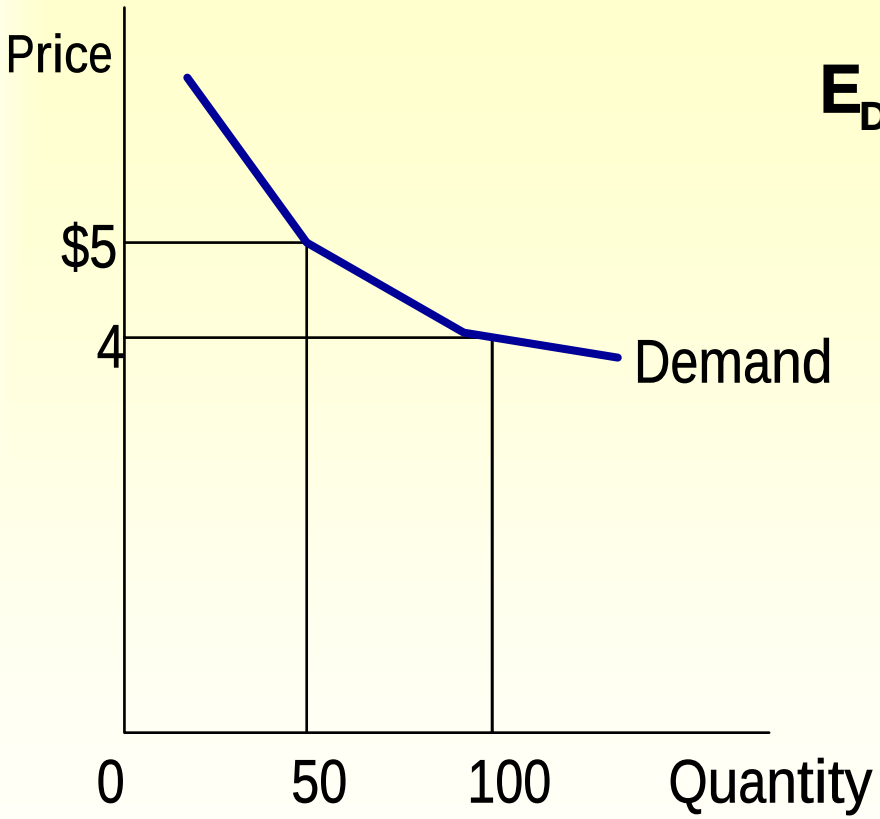
Computing the Price Elasticity of Demand



$$E_D = \frac{(100-50)/(100+50)/2}{(4.00-5.00)/(4.00+5.00)/2}$$

$$= \frac{67\ \text{percent}}{-22\ \text{percent}} = -3$$

Demand is price elastic

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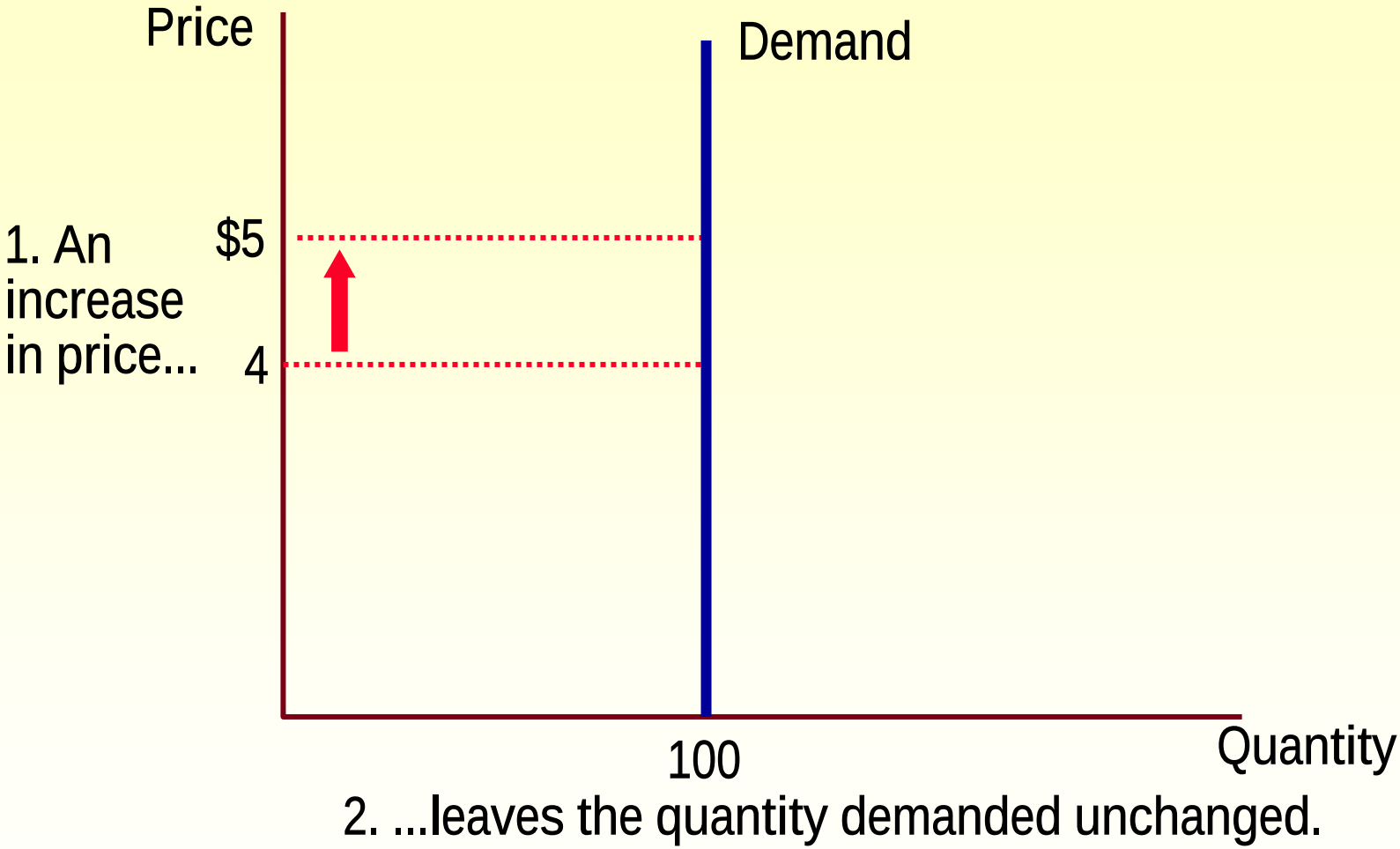
Perfectly Inelastic Demand
- Elasticity equals 0



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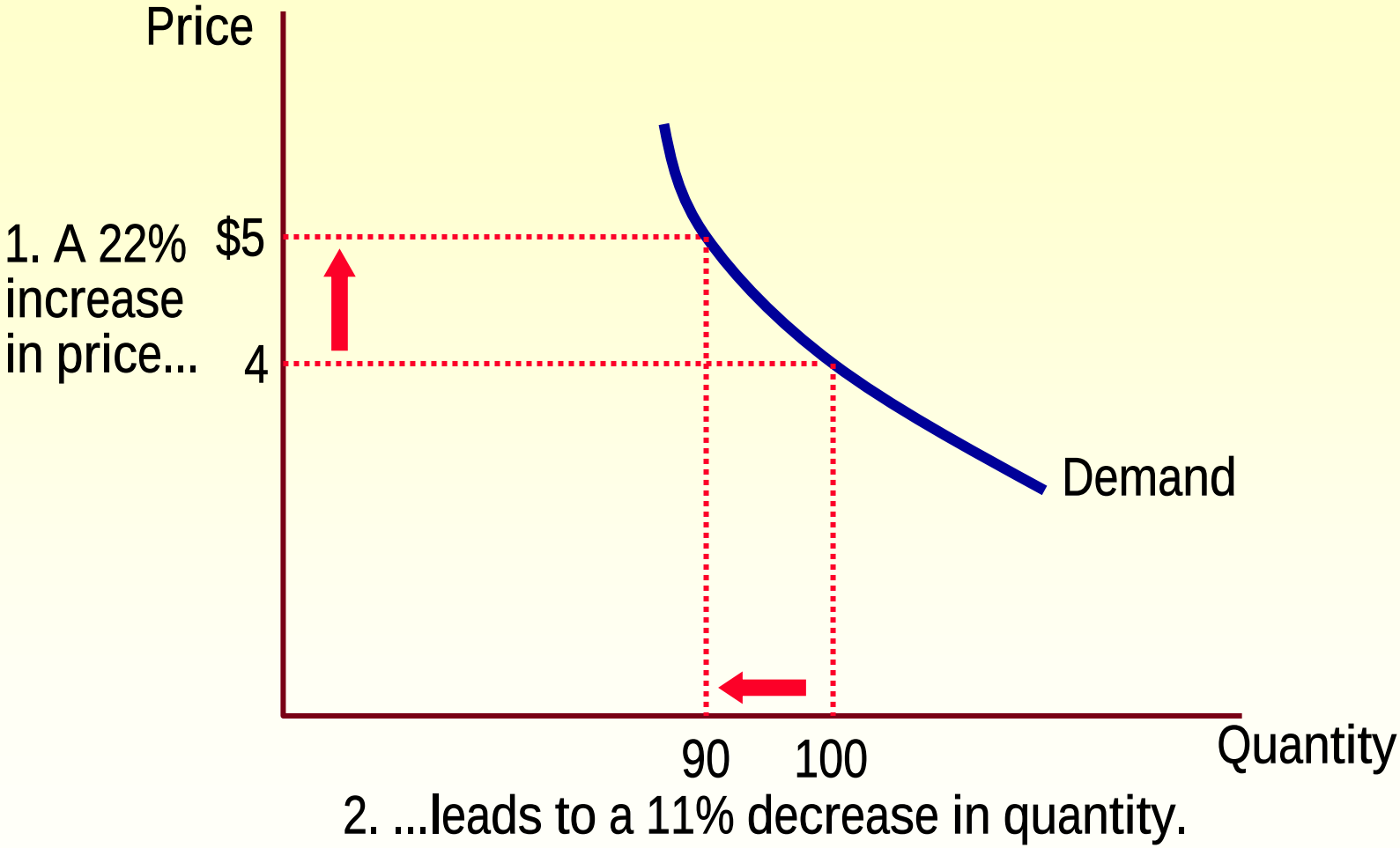
Inelastic Demand
- Elasticity is less than 1



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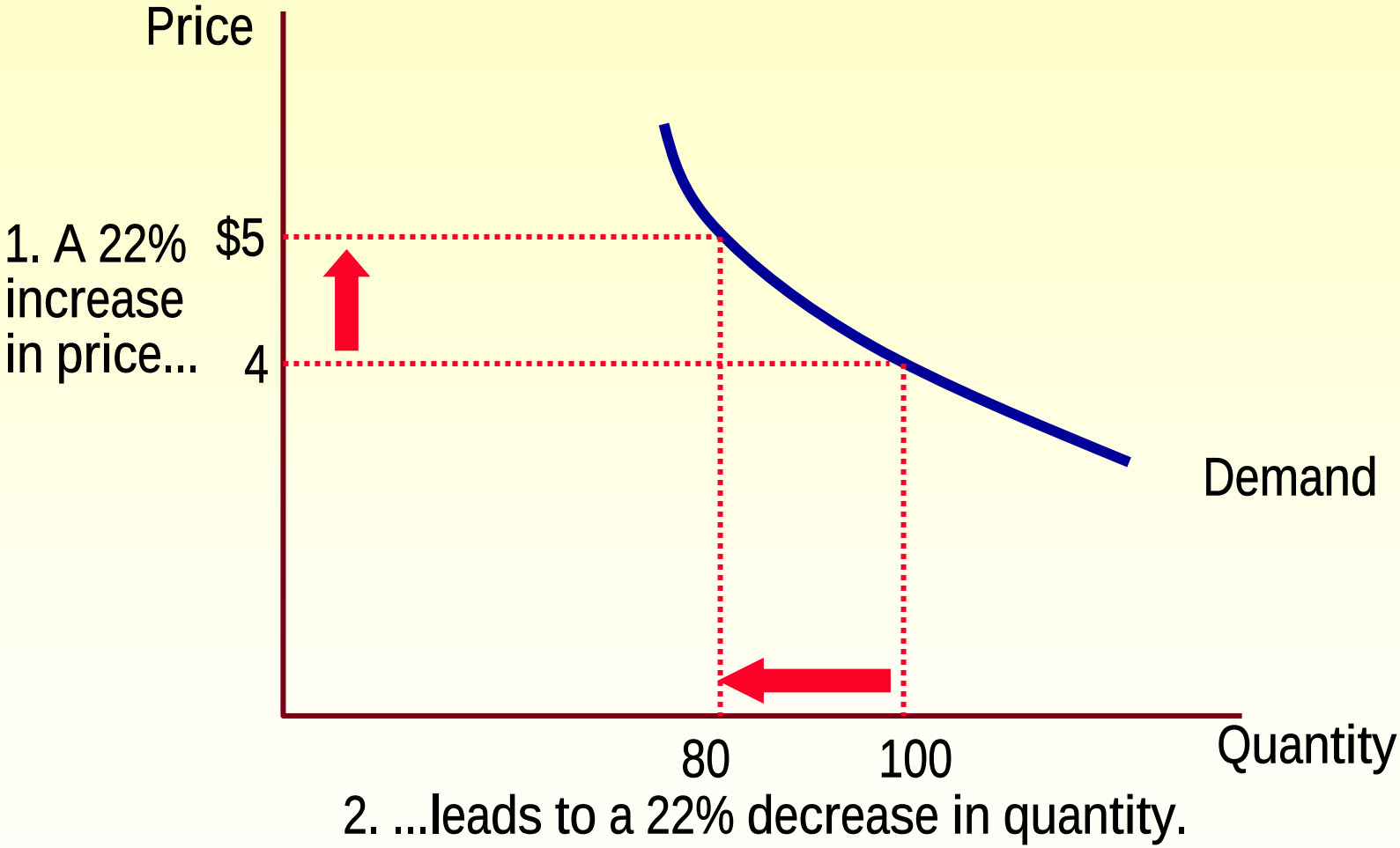
Unit Elastic Demand
- Elasticity equals 1



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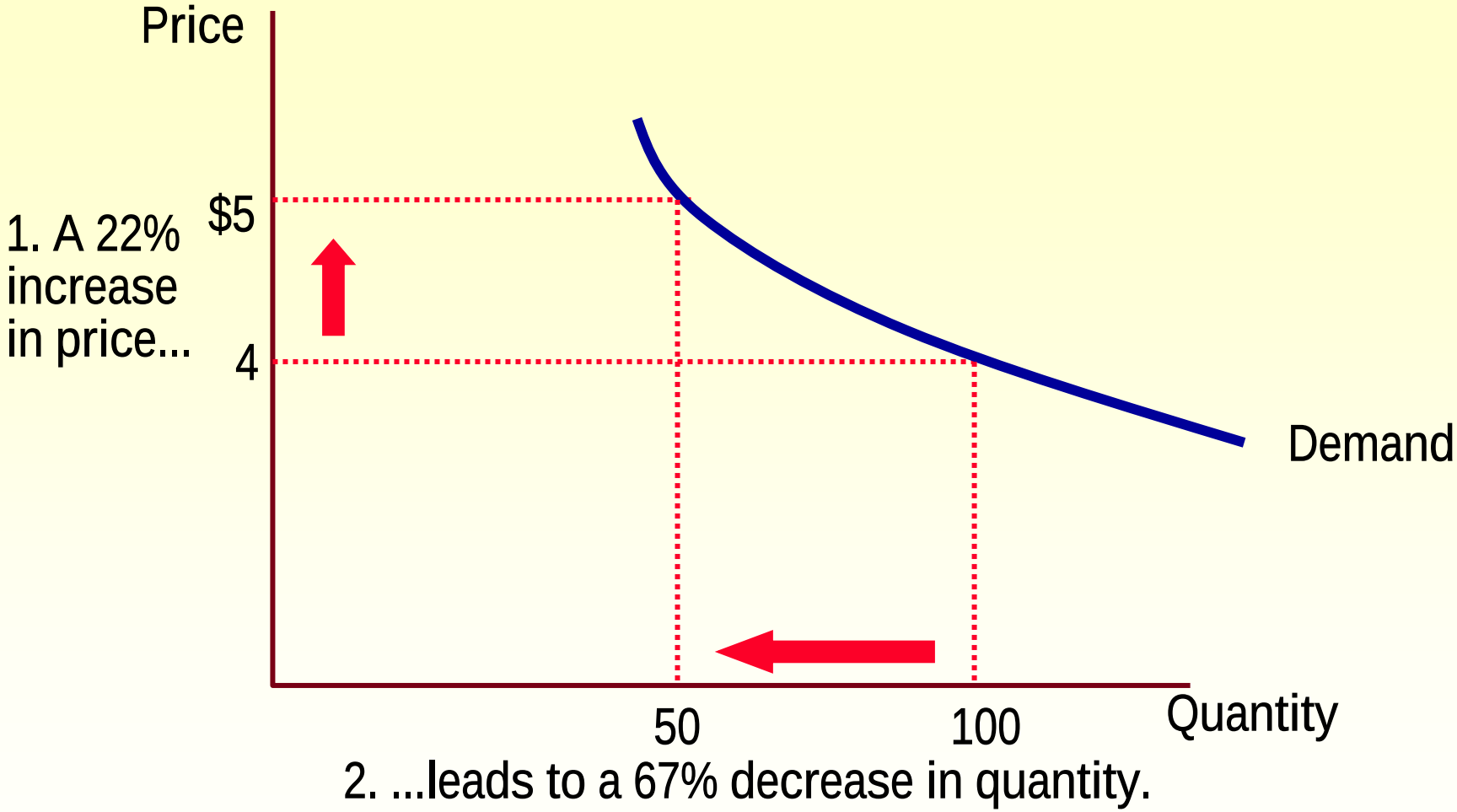
Elastic Demand
- Elasticity is greater than 1



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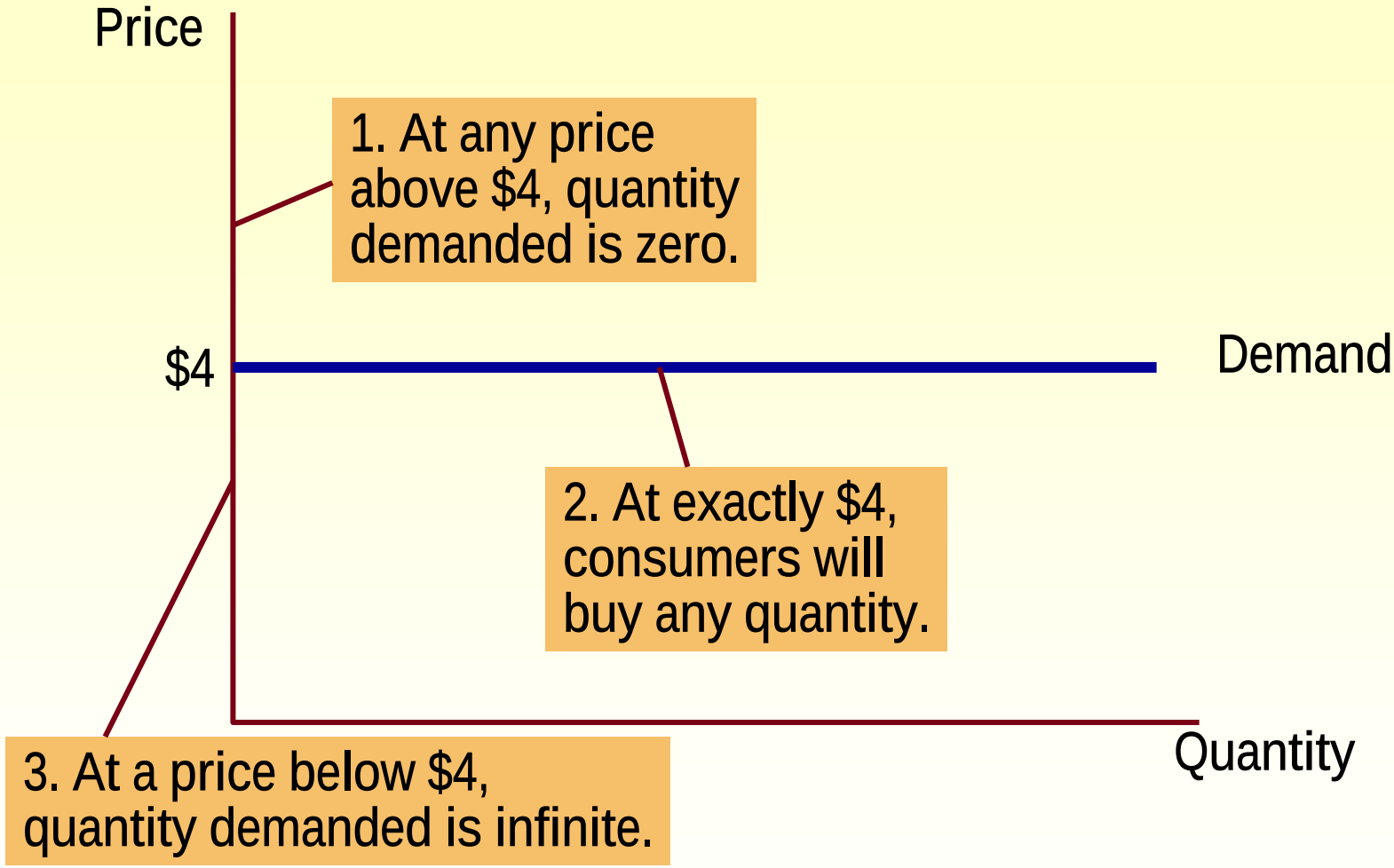
Perfectly Elastic Demand
- Elasticity equals infinity



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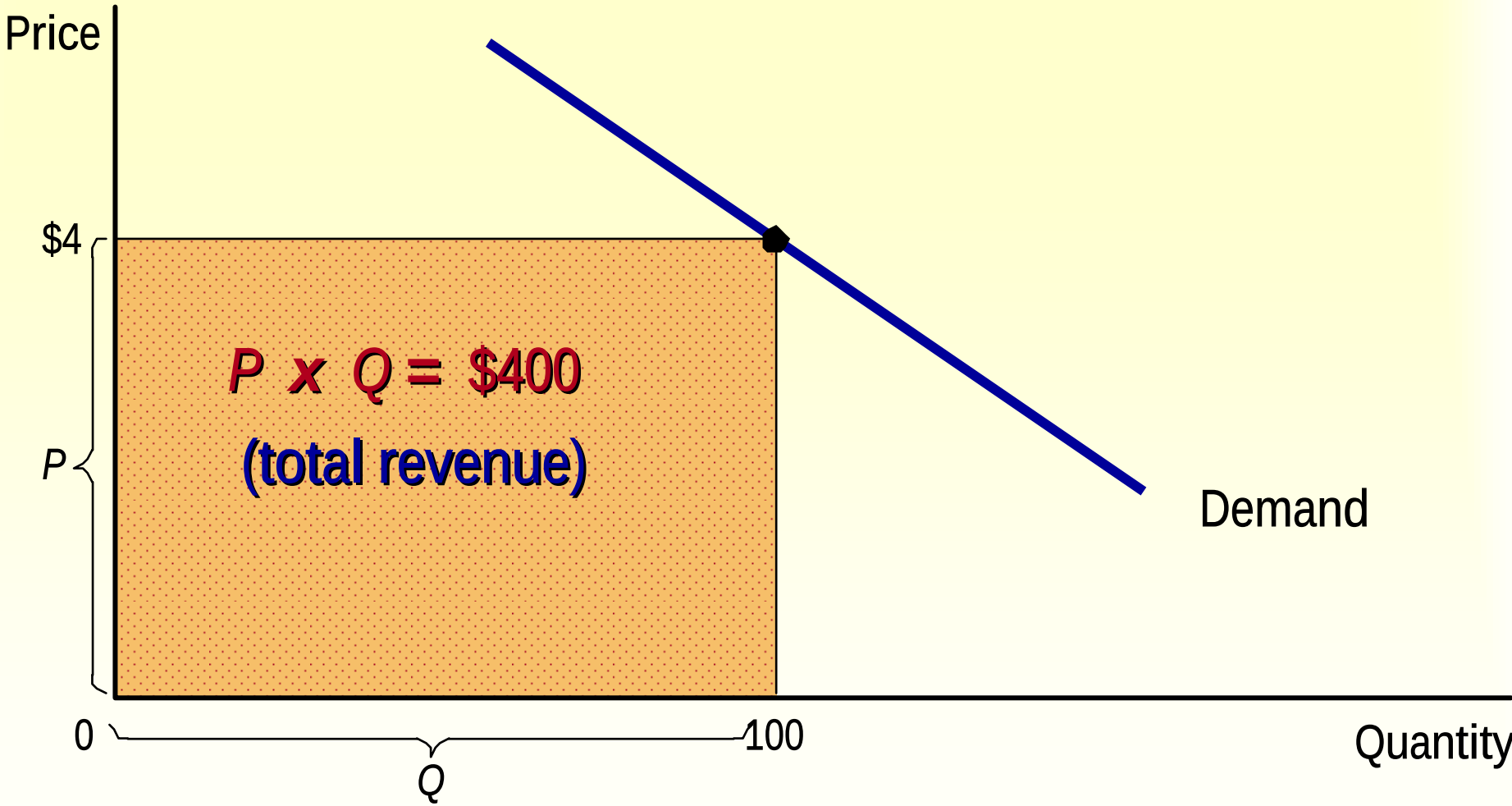
Elasticity and Total Revenue



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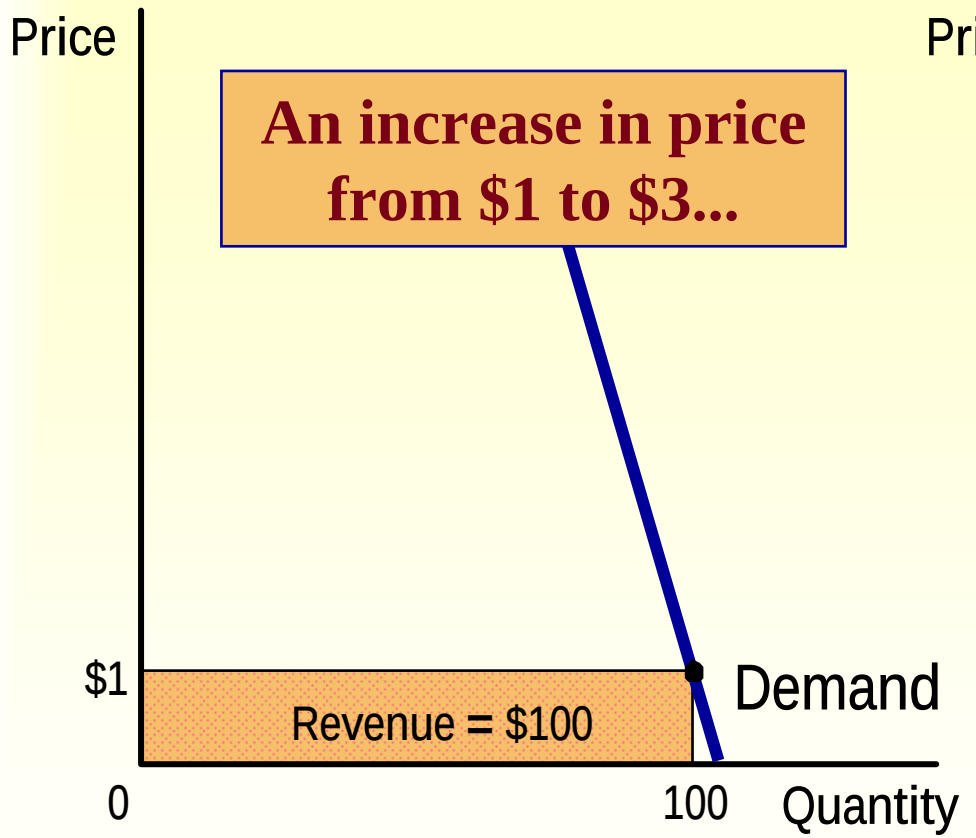
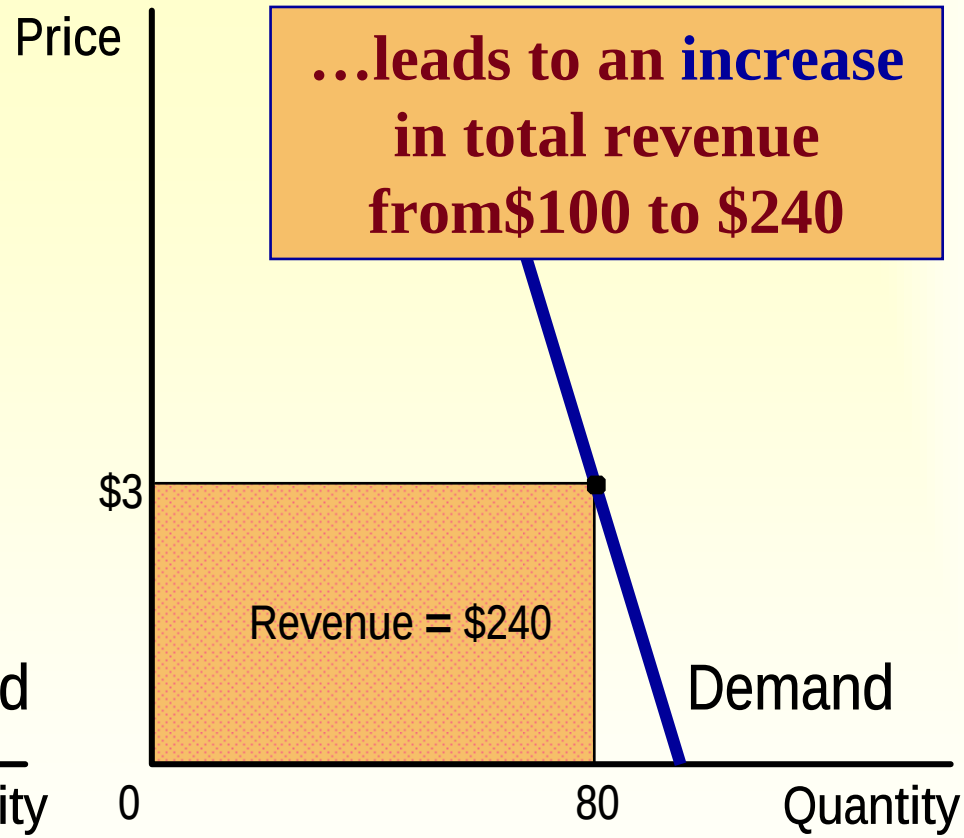
Elasticity and Total Revenue: Inelastic Demand





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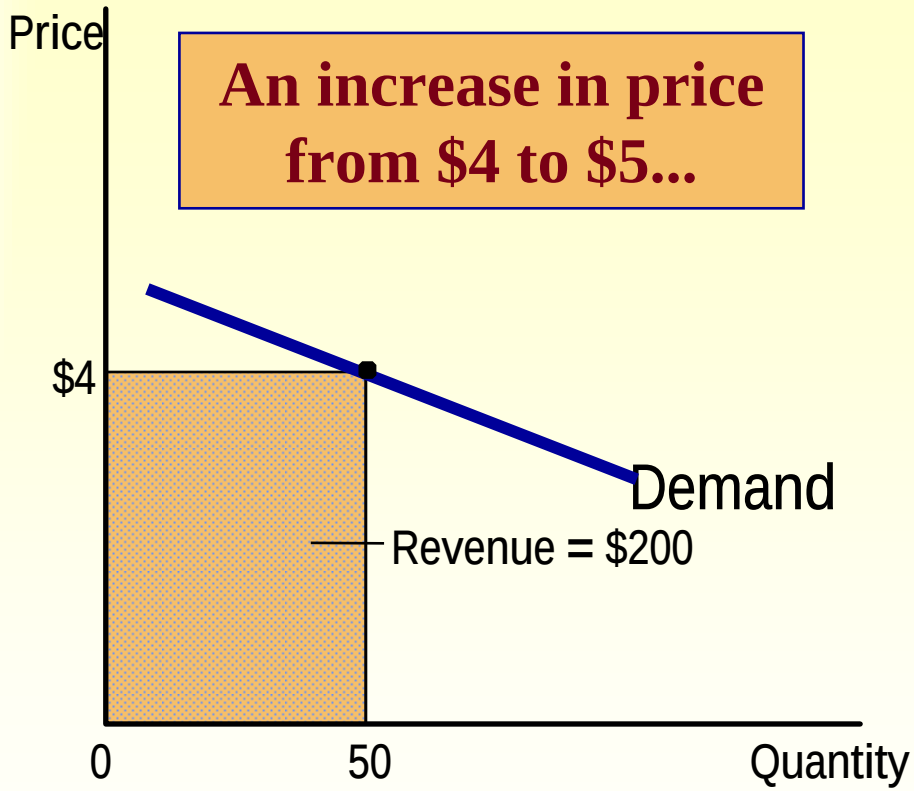
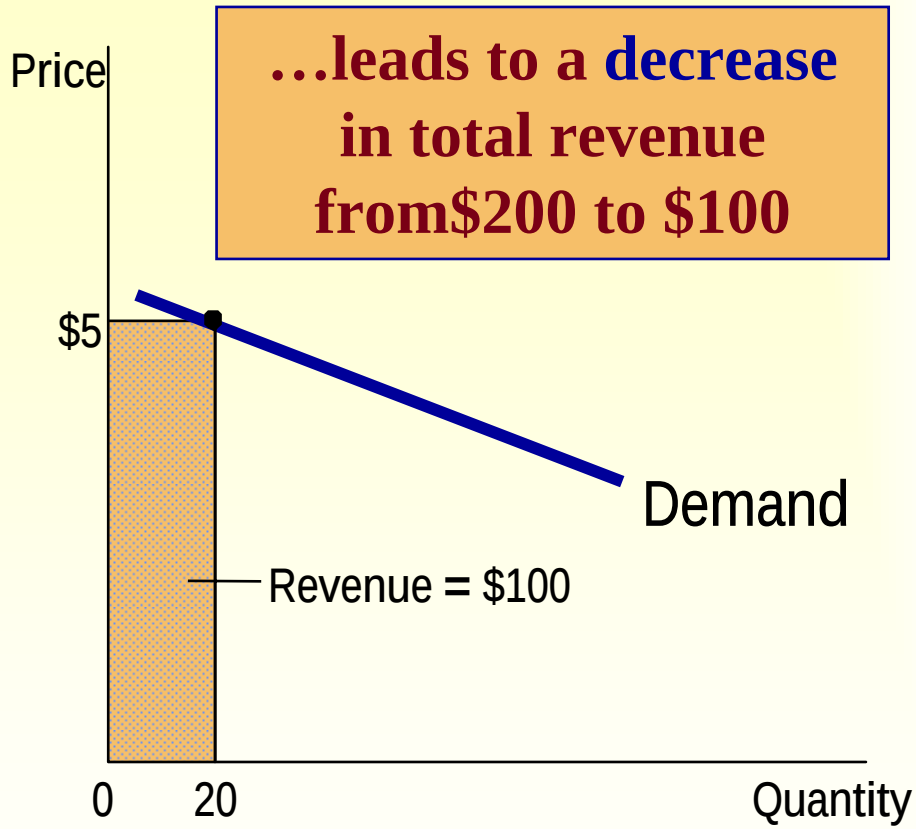
Elasticity and Total Revenue: Elastic Demand





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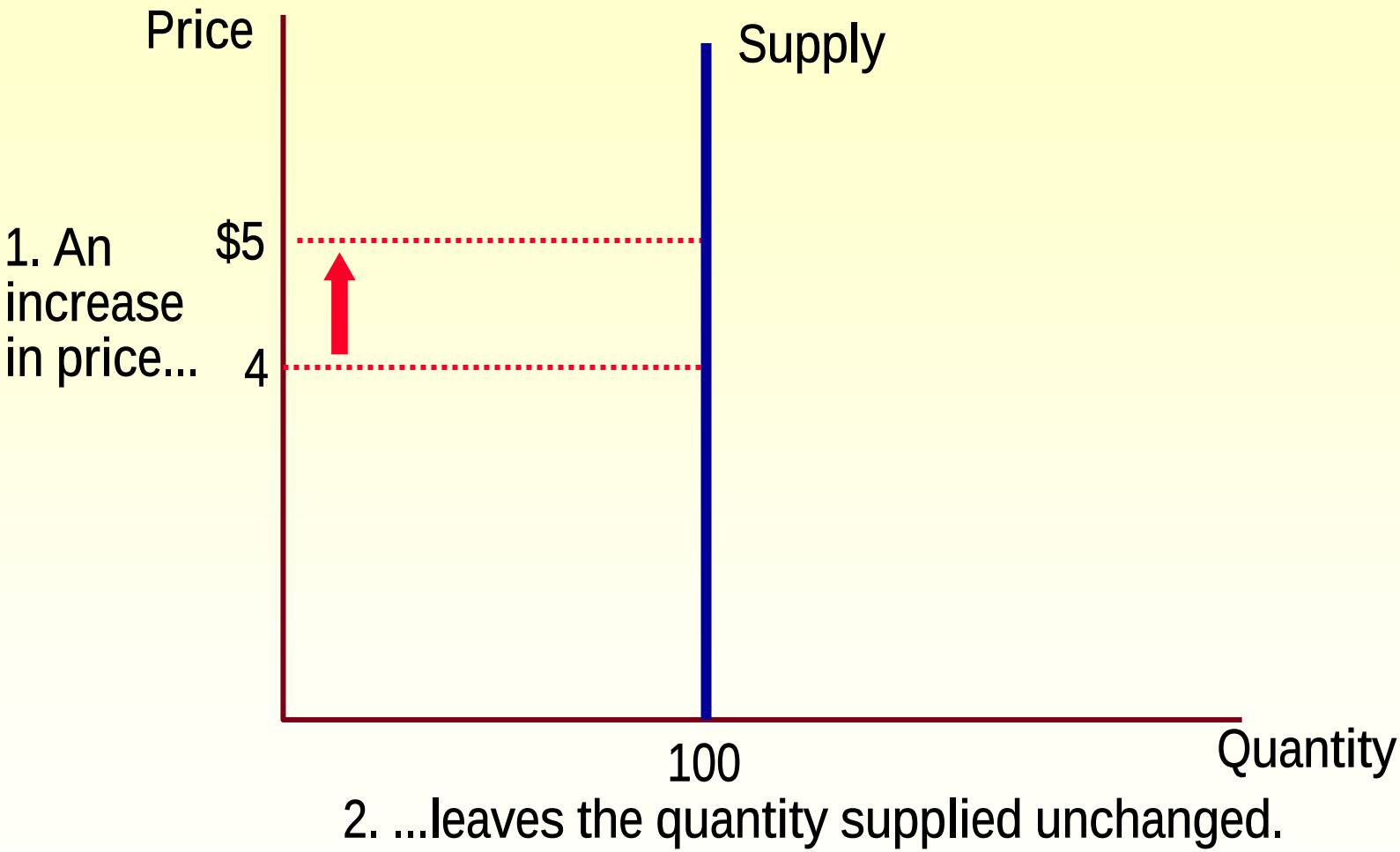
Perfectly Inelastic Supply
- Elasticity equals 0



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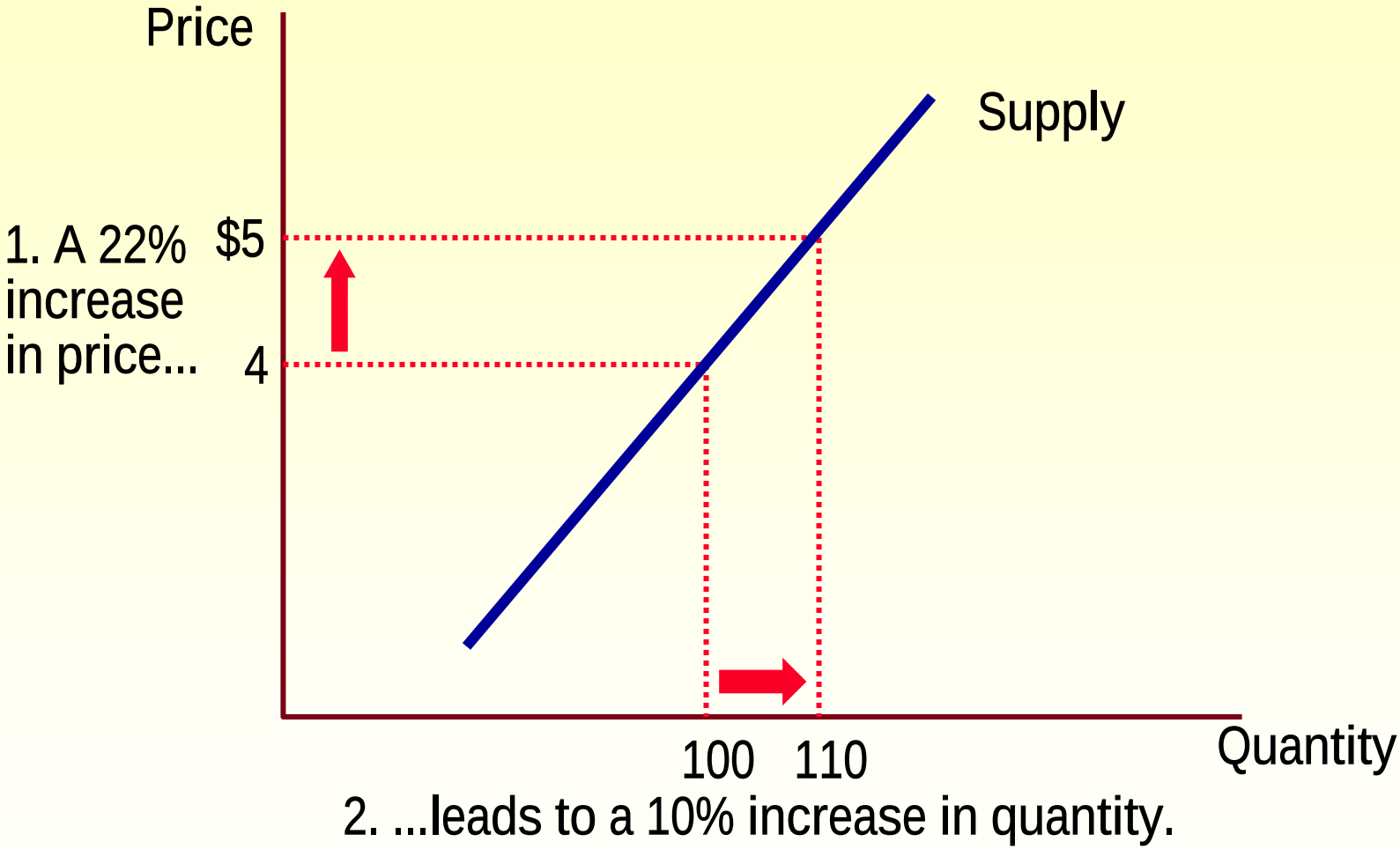
Inelastic Supply
- Elasticity is less than 1



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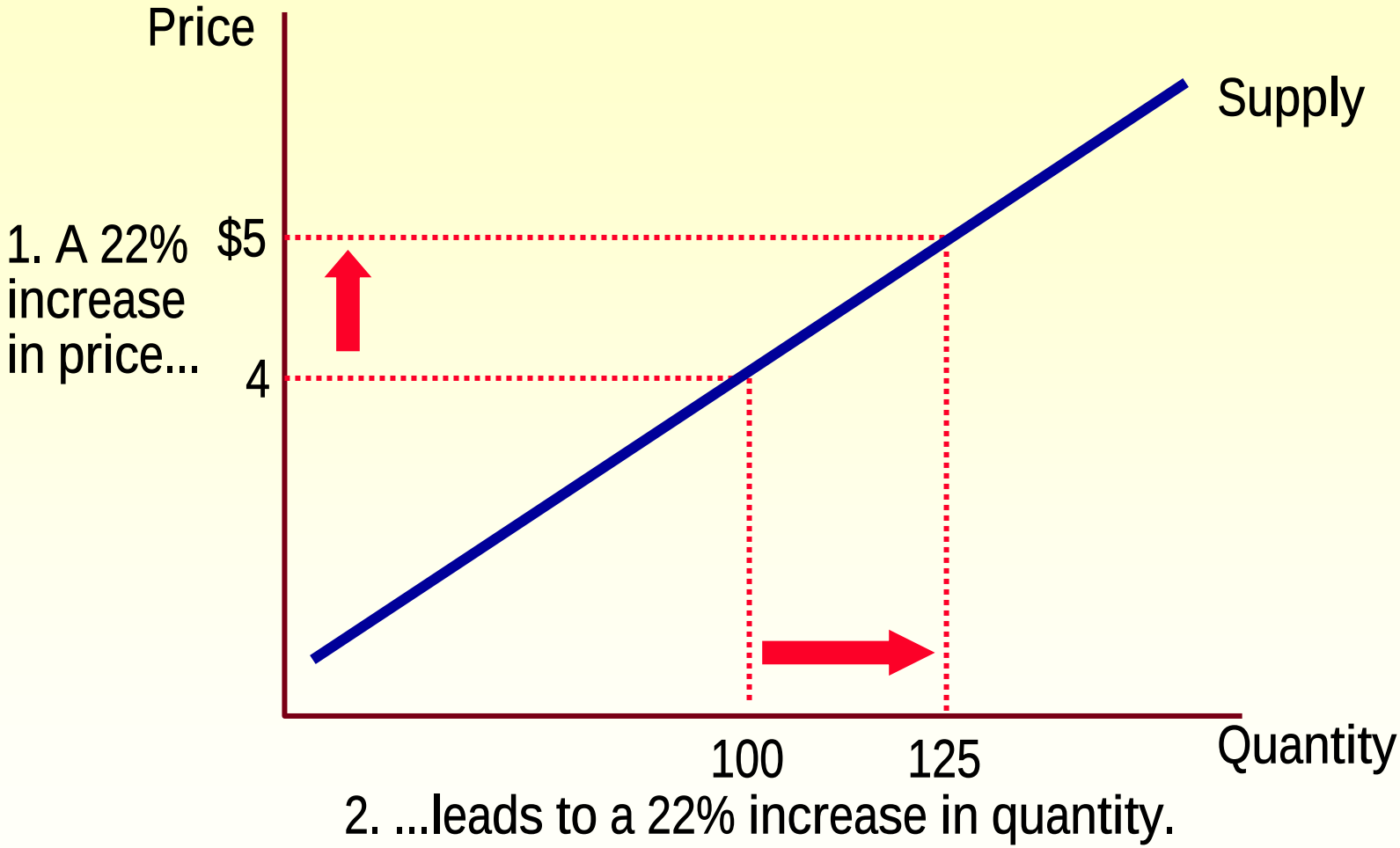
Unit Elastic Supply
- Elasticity equals 1



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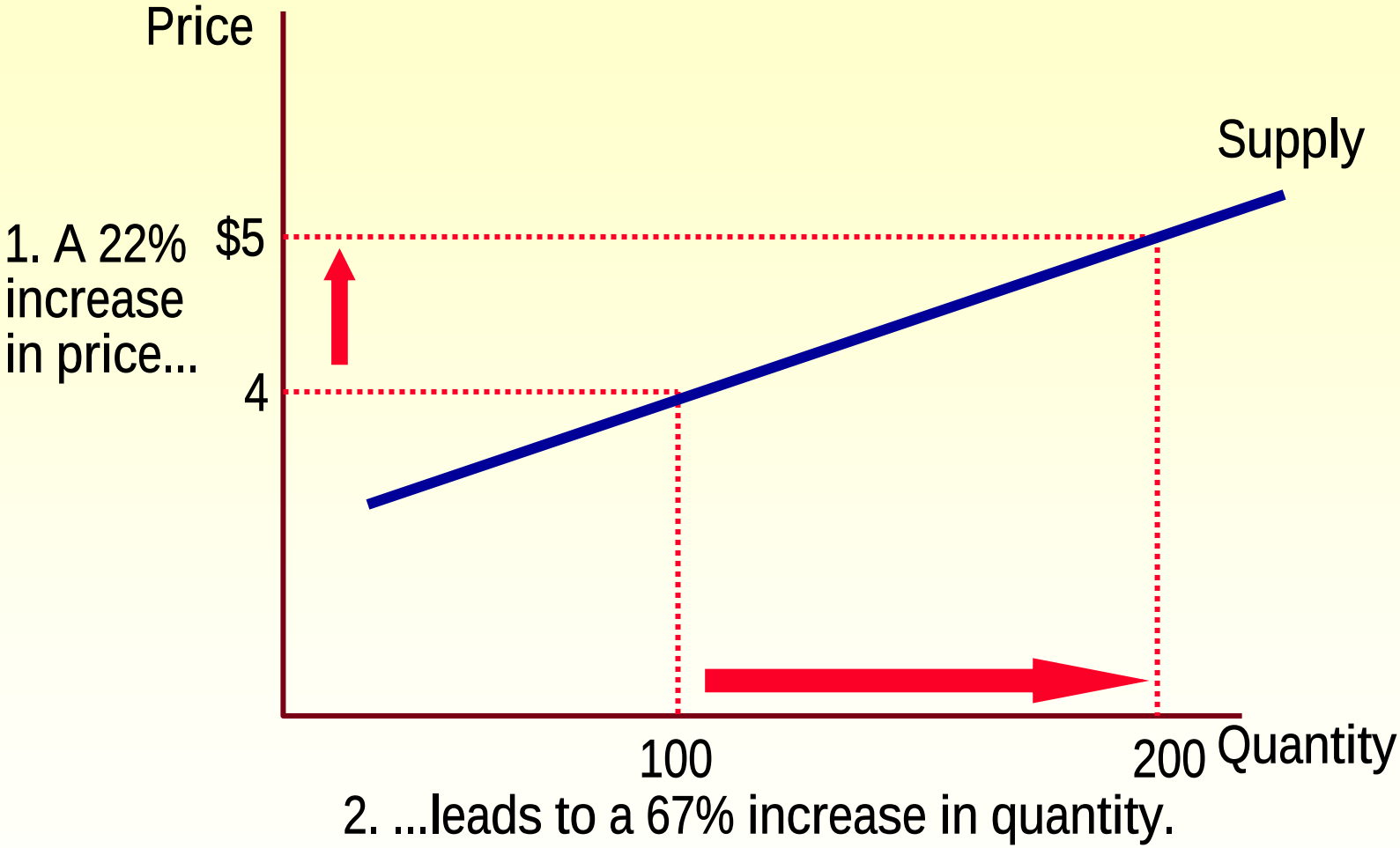
Elastic Supply
- Elasticity is greater than 1



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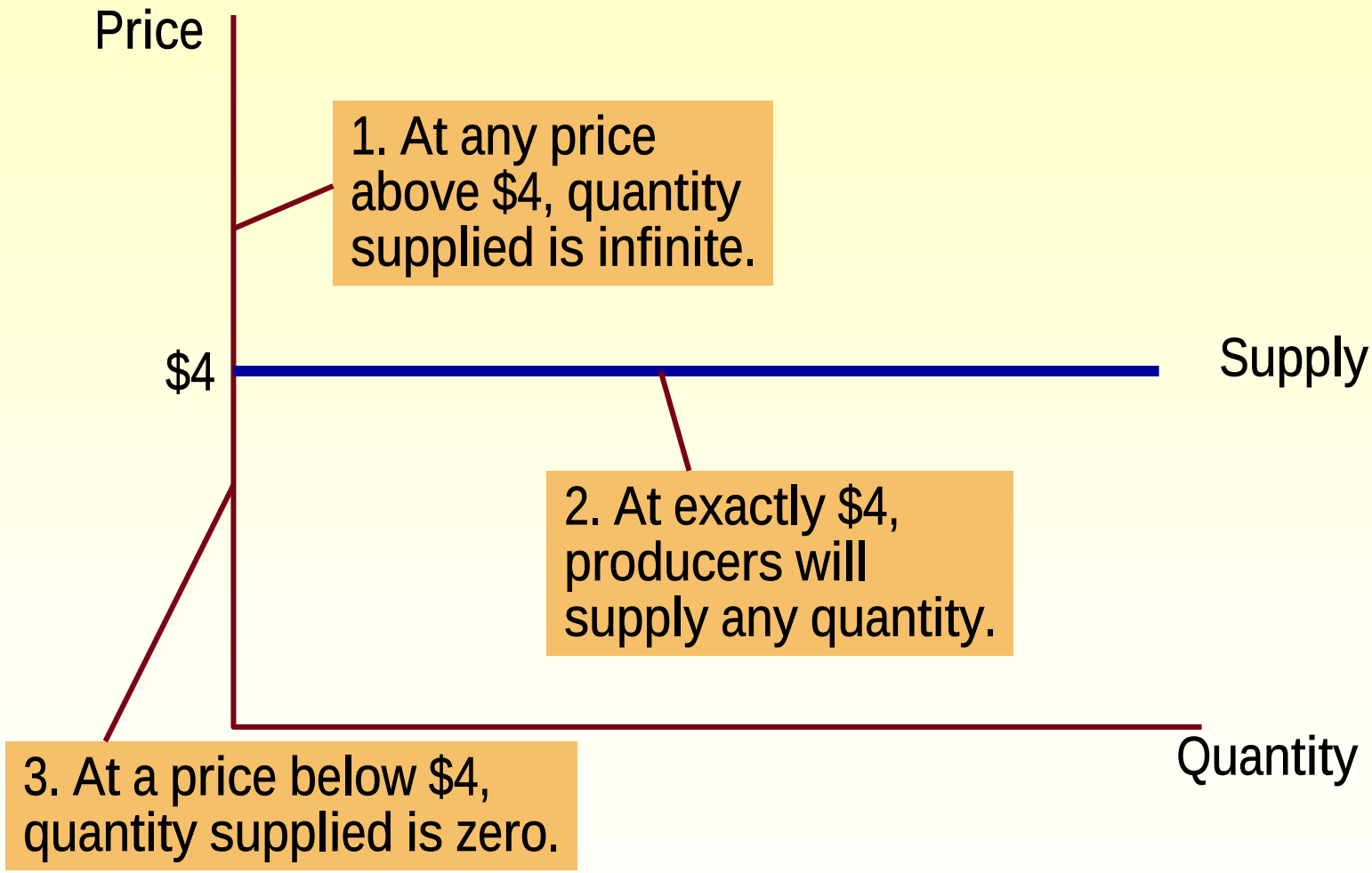
Perfectly Elastic Supply
- Elasticity equals infinity



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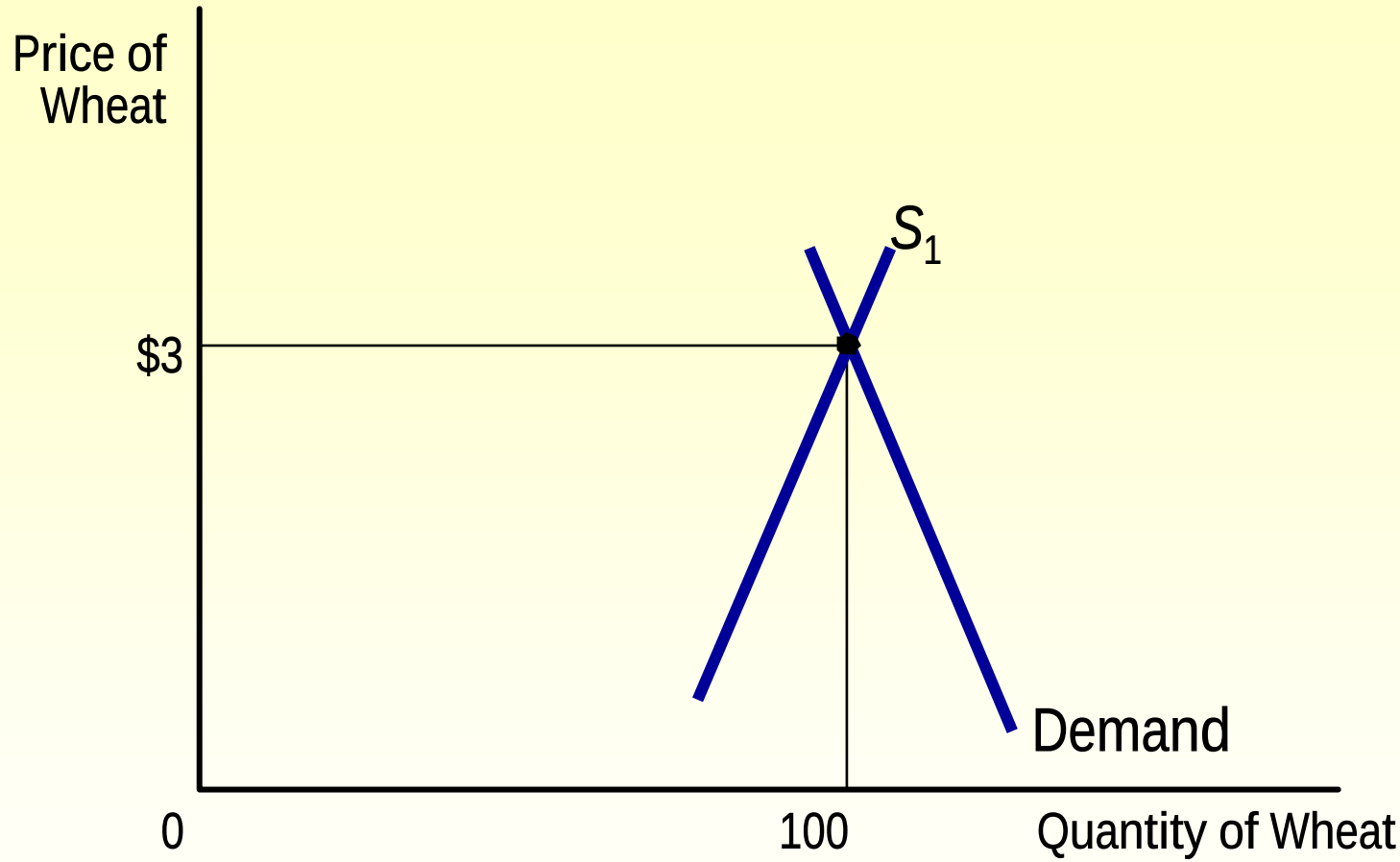
An Increase in Supply in the Market for Wheat



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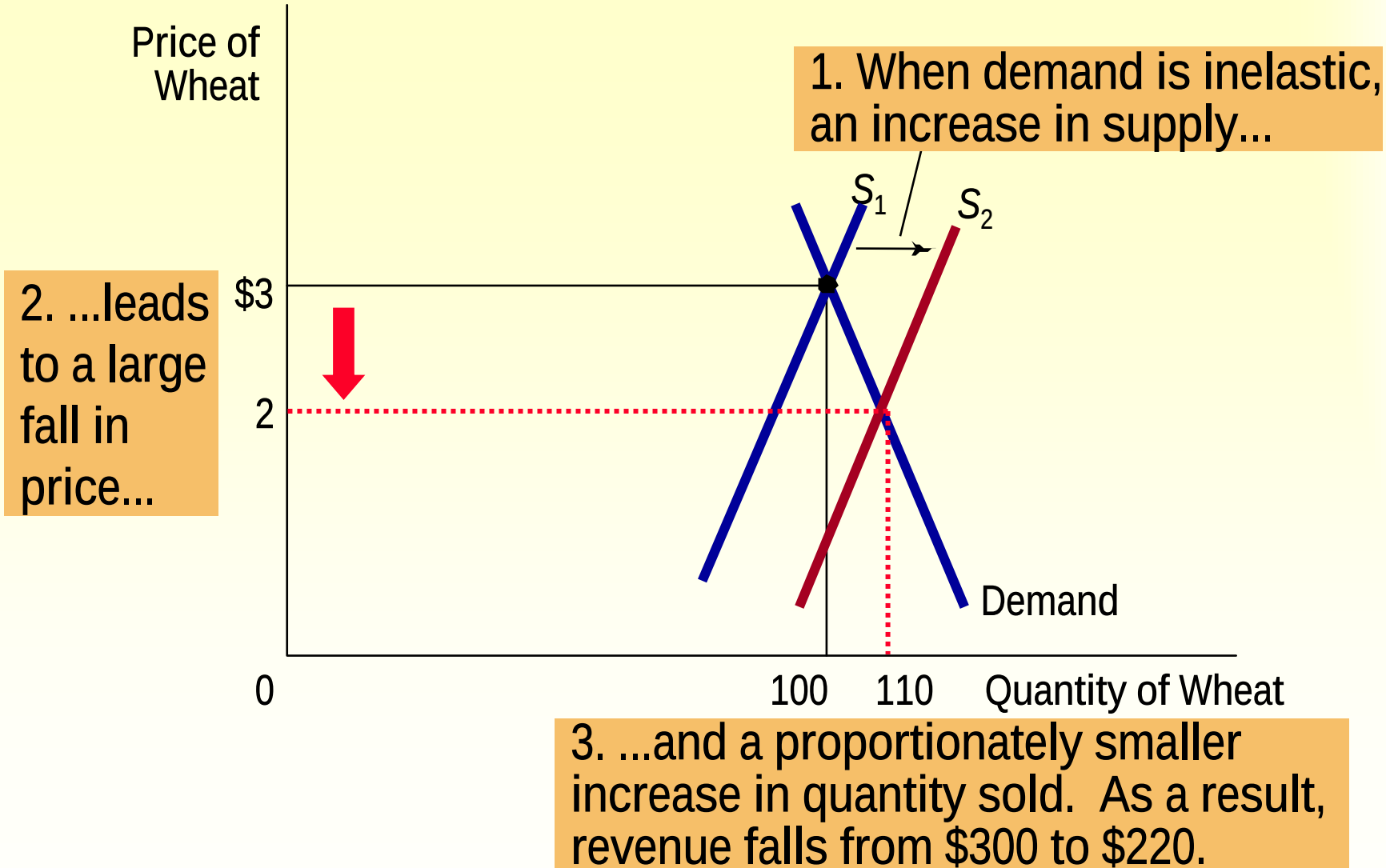
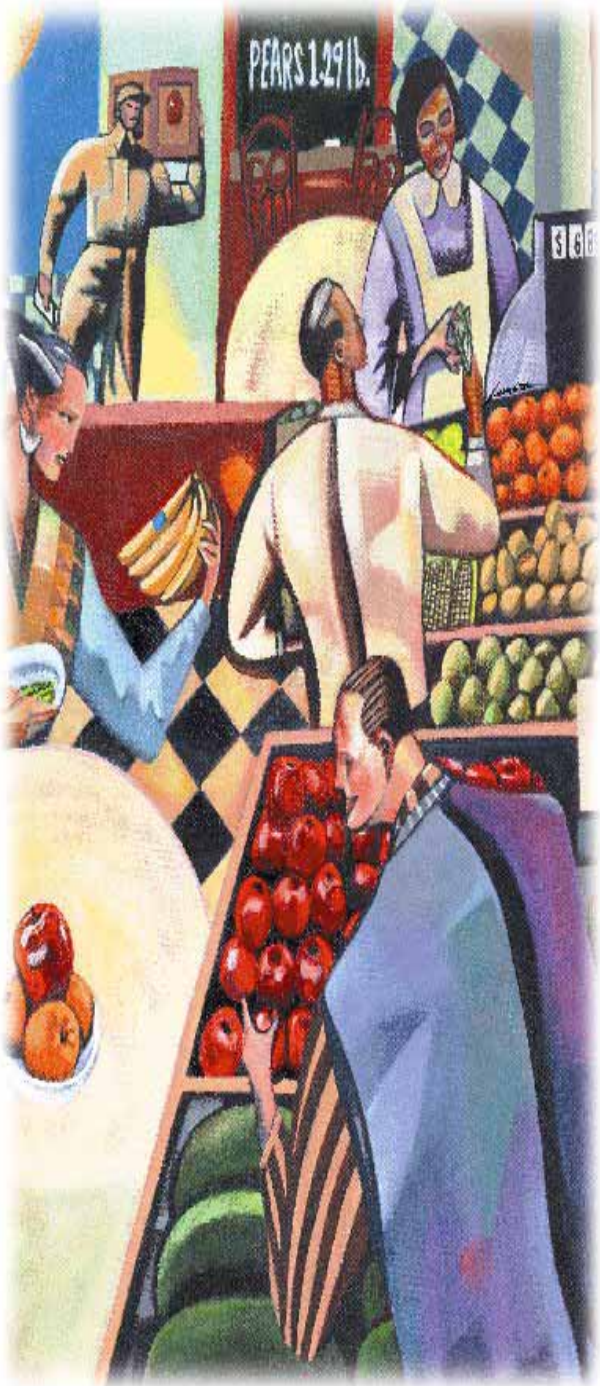
An Increase in Supply in the Market for Wheat





Supply, Demand and Government Policies

Chapter 6

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Supply, Demand, and Government Policies

- In a free, unregulated market system, market forces establish equilibrium prices and exchange quantities.
- While equilibrium conditions may be efficient, it may be true that not everyone is satisfied.
- One of the roles of economists is to use their theories to assist in the development of policies.

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Price Controls...

- Are usually enacted when policymakers believe the market price is unfair to buyers or sellers.
- Result in government-created **price ceilings** and **floors.**

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Price Ceilings & Price Floors

Price Ceiling

- A legally established maximum price at which a good can be sold.

Price Floor

- A legally established minimum price at which a good can be sold.

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Price Ceilings

Two outcomes are possible when the government imposes a price ceiling:

- **The price ceiling *is not* binding if set *above* the equilibrium price.**
- **The price ceiling *is* binding if set *below* the equilibrium price, leading to a shortage.**

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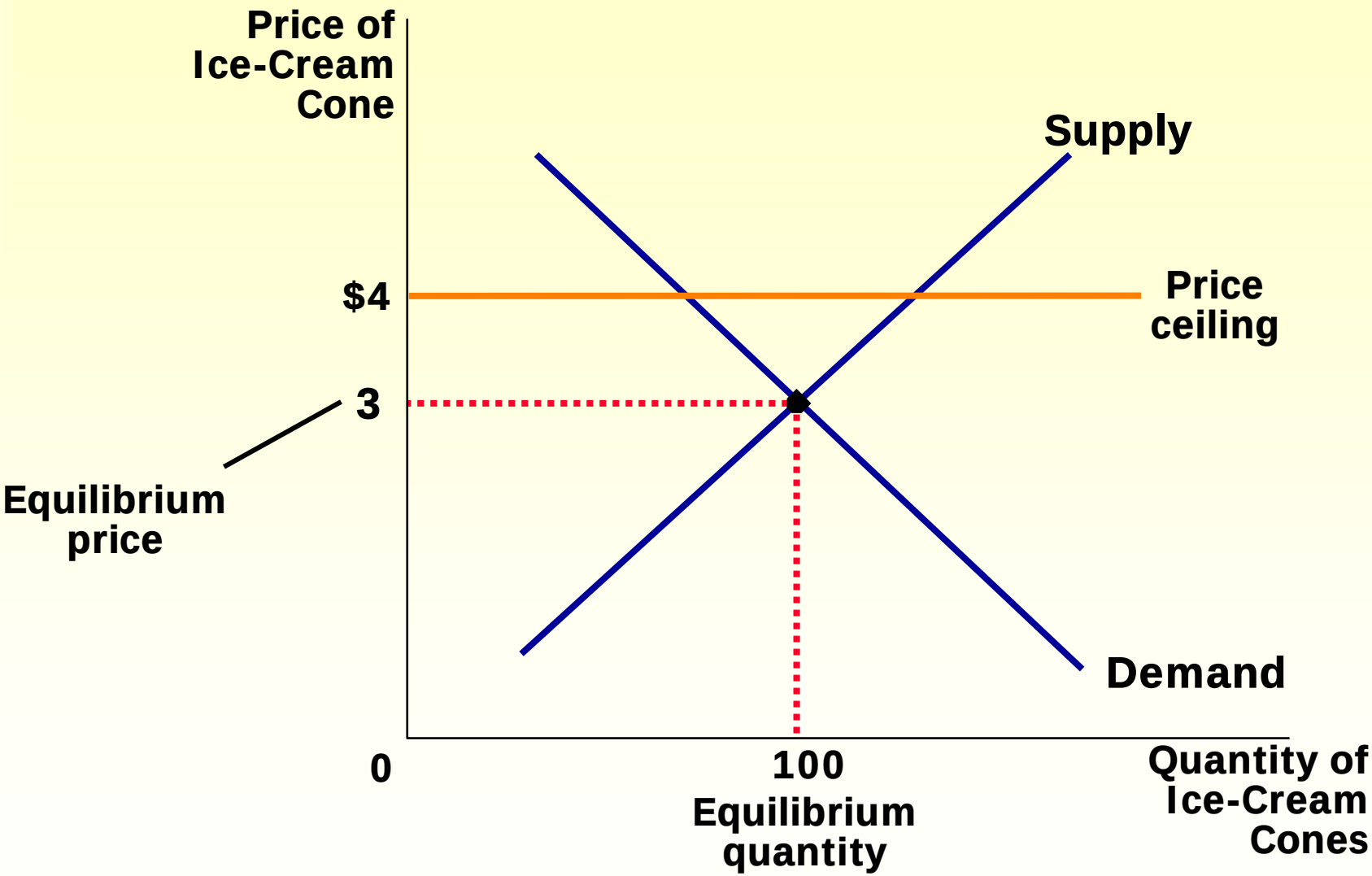
A Price Ceiling That Is Not Binding...



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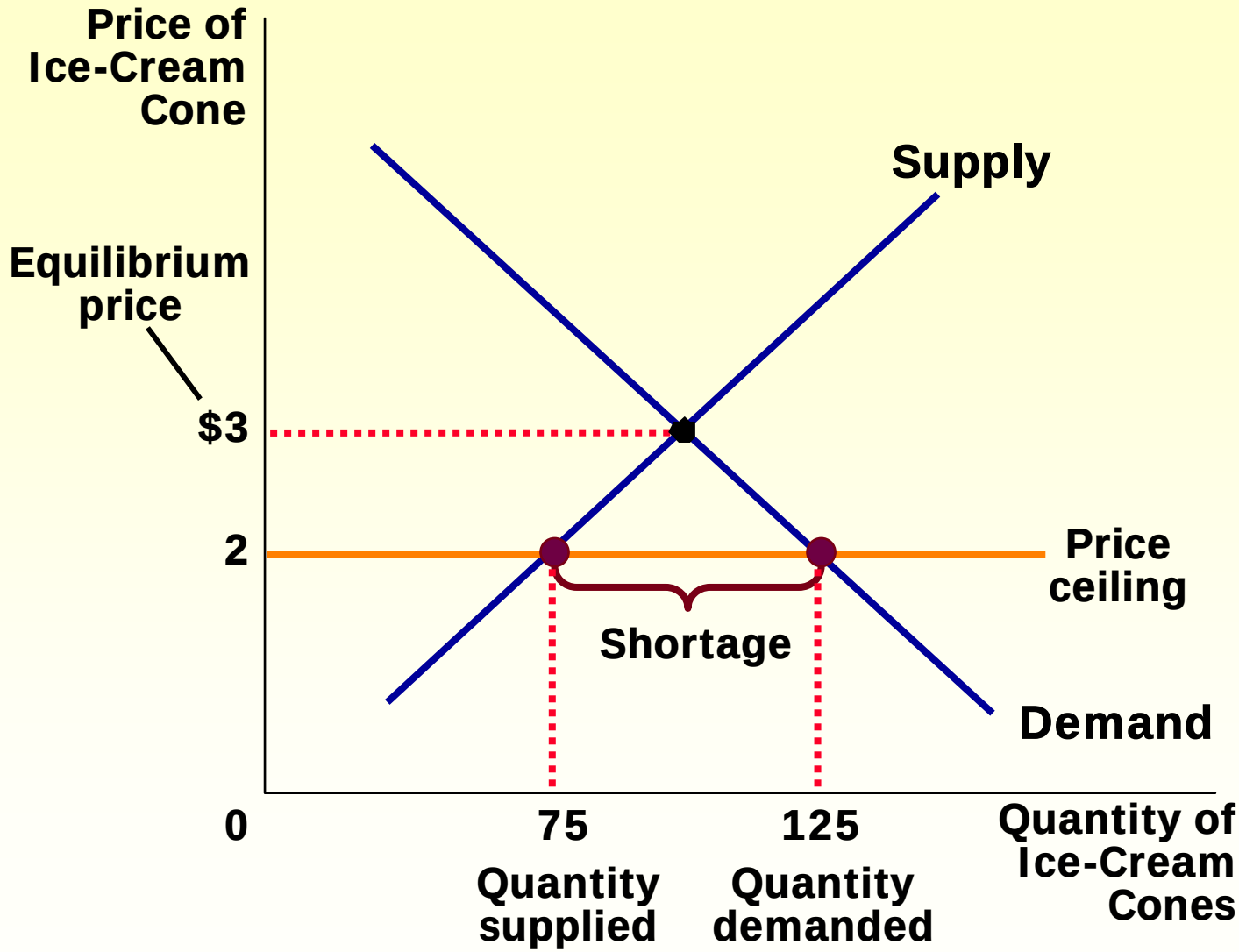
A Price Ceiling That Is Binding...



Effects of Price Ceilings

A binding price ceiling creates ...

… shortages because $Q_D > Q_S$.

- **Example: Gasoline shortage of the 1970s**

… nonprice rationing

- **Examples: Long lines, Discrimination by sellers**

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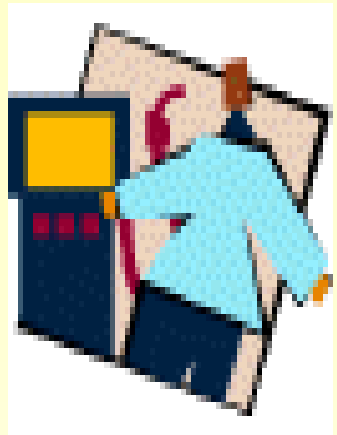
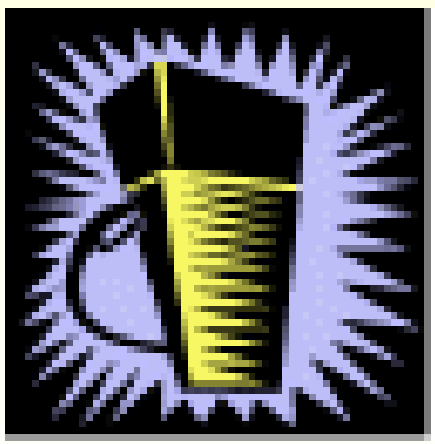
Lines at the Gas Pump

In 1973 OPEC raised the price of crude oil in world markets. Because crude oil is the major input used to make gasoline, the higher oil prices reduced the supply of gasoline.





What was responsible for the long gas lines?

Economists blame government regulations that limited the price oil companies could charge for gasoline.

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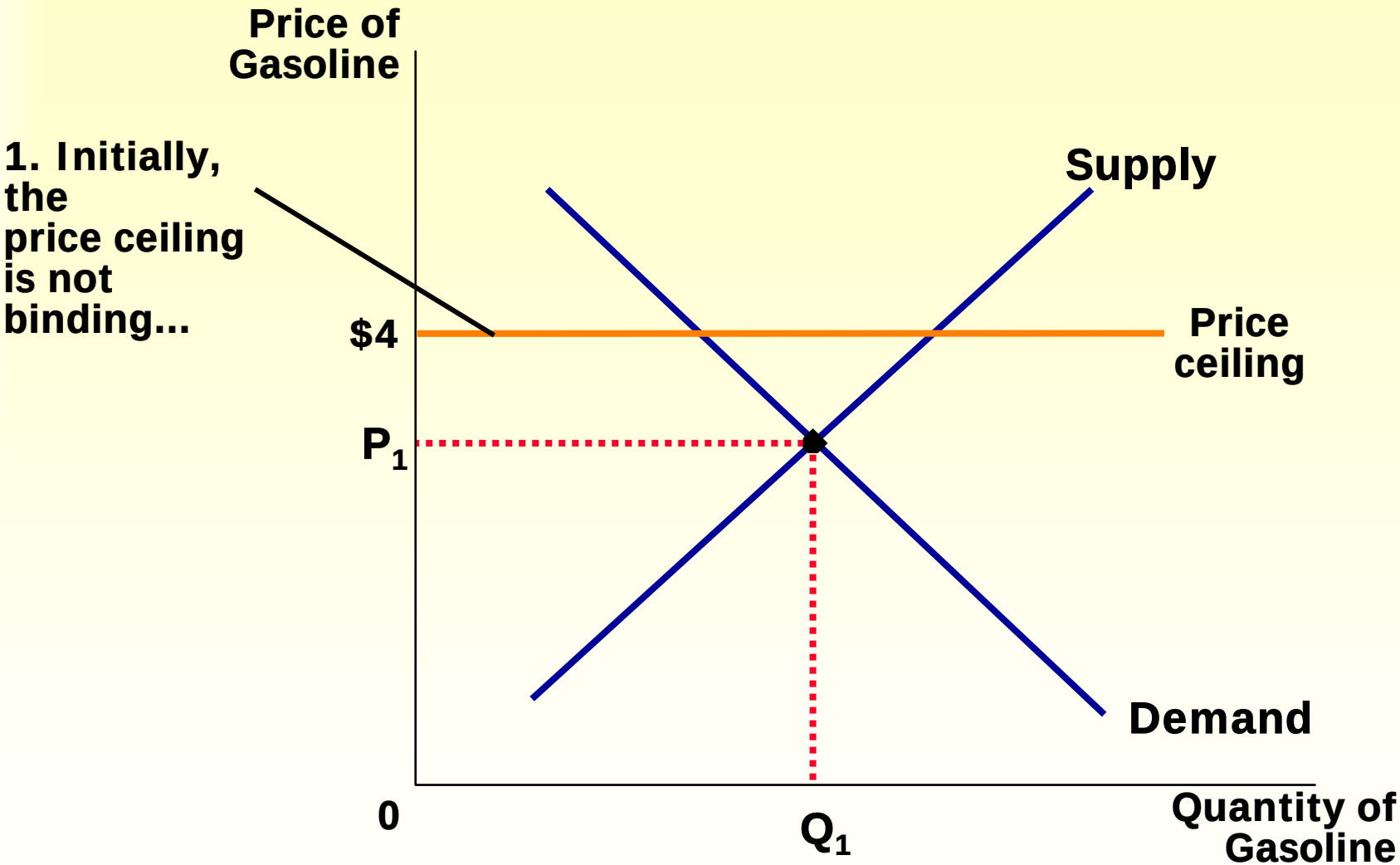
The Price Ceiling on Gasoline Is Not Binding...



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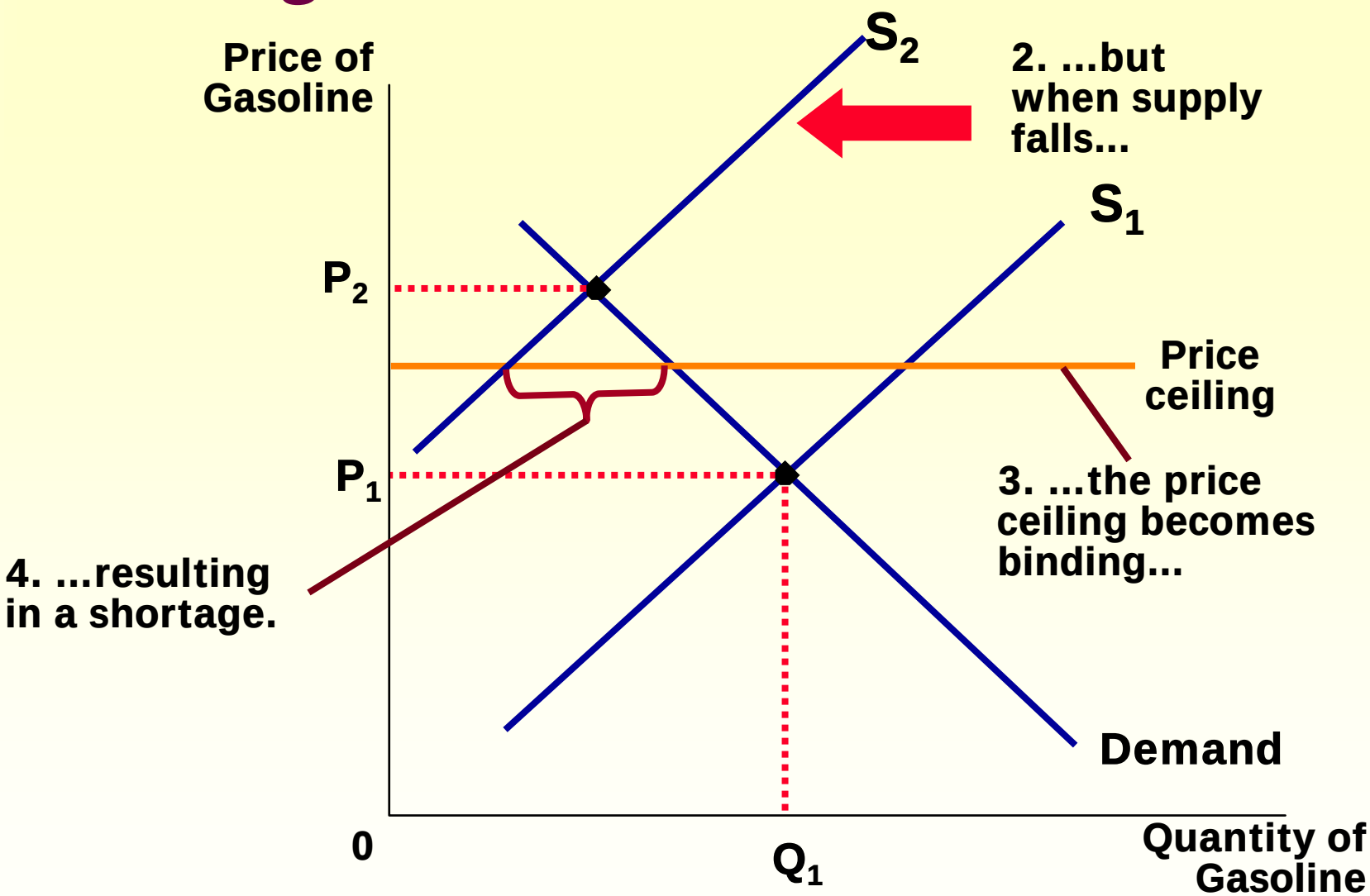
The Price Ceiling on Gasoline Is Binding...



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Rent Control

- Rent controls are ceilings placed on the rents that landlords may charge their tenants.
- The goal of rent control policy is to help the poor by making housing more affordable.
- One economist called rent control “the best way to destroy a city, other than bombing.”

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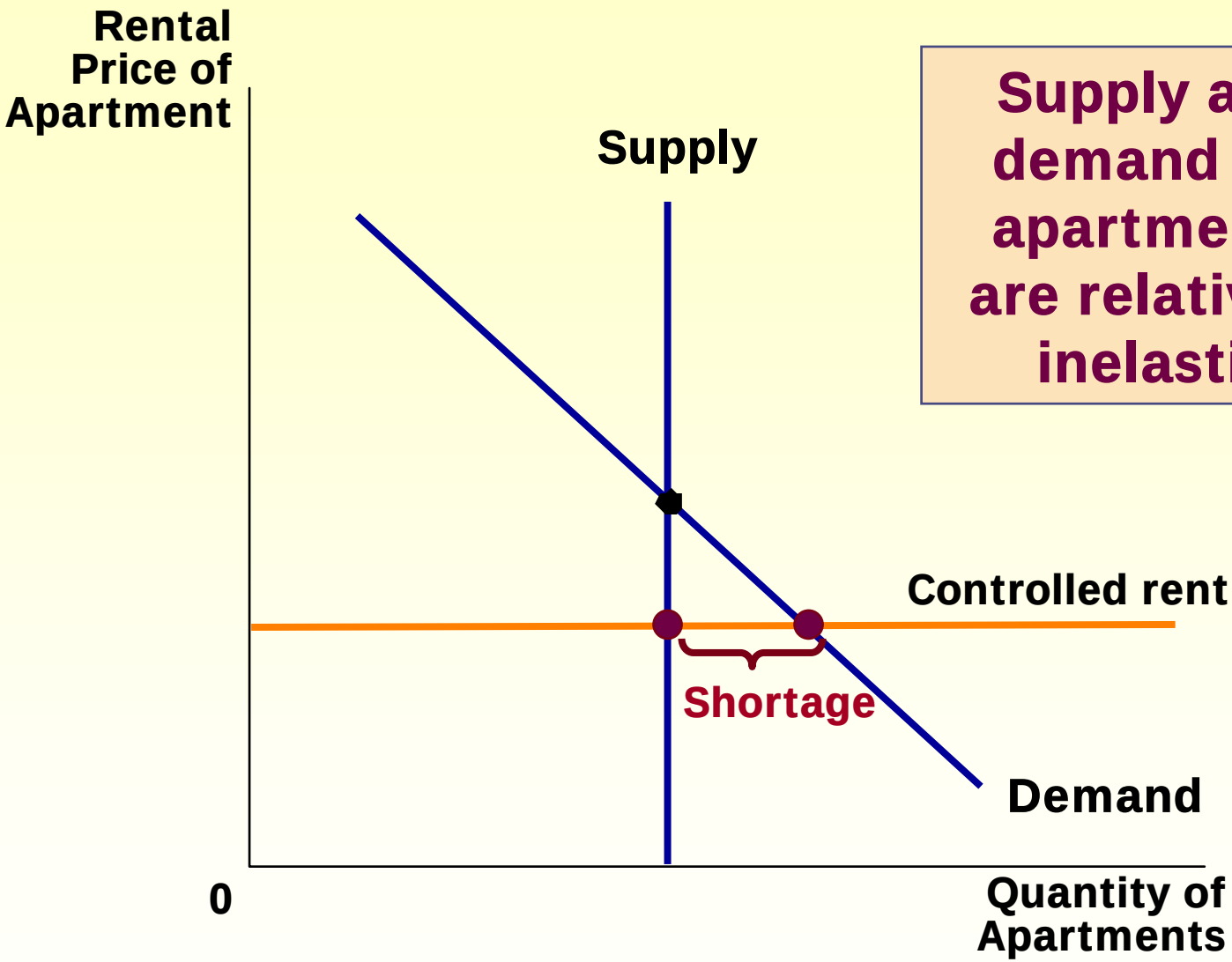
Rent Control in the Short Run...



Supply and demand for apartments are relatively inelastic

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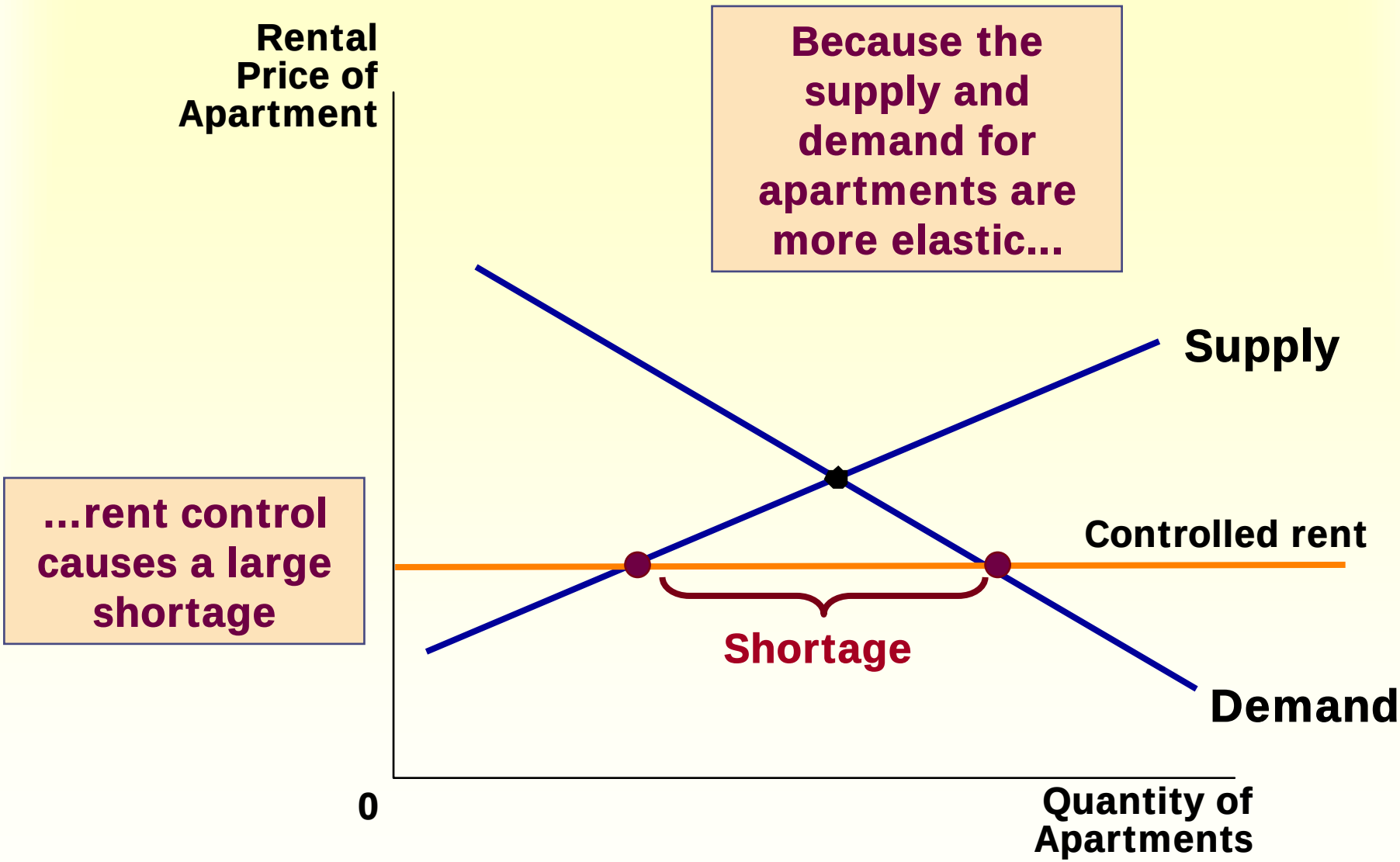
Rent Control in the Long Run...



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Price Floors

When the government imposes a price floor, two outcomes are possible.

- **The price floor *is not* binding if set *below* the equilibrium price.**
- **The price floor *is* binding if set *above* the equilibrium price, leading to a surplus.**

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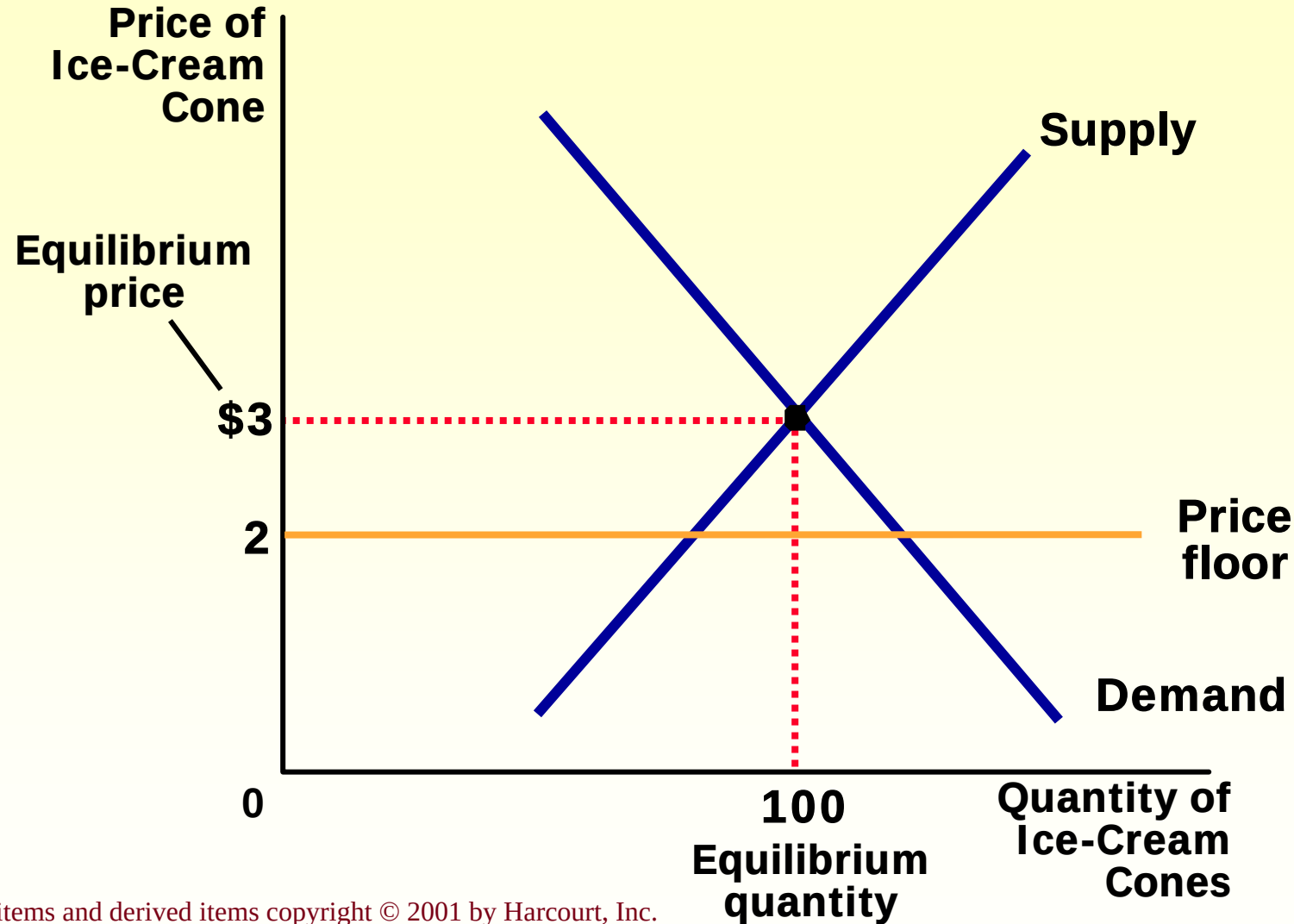
A Price Floor That Is Not Binding...



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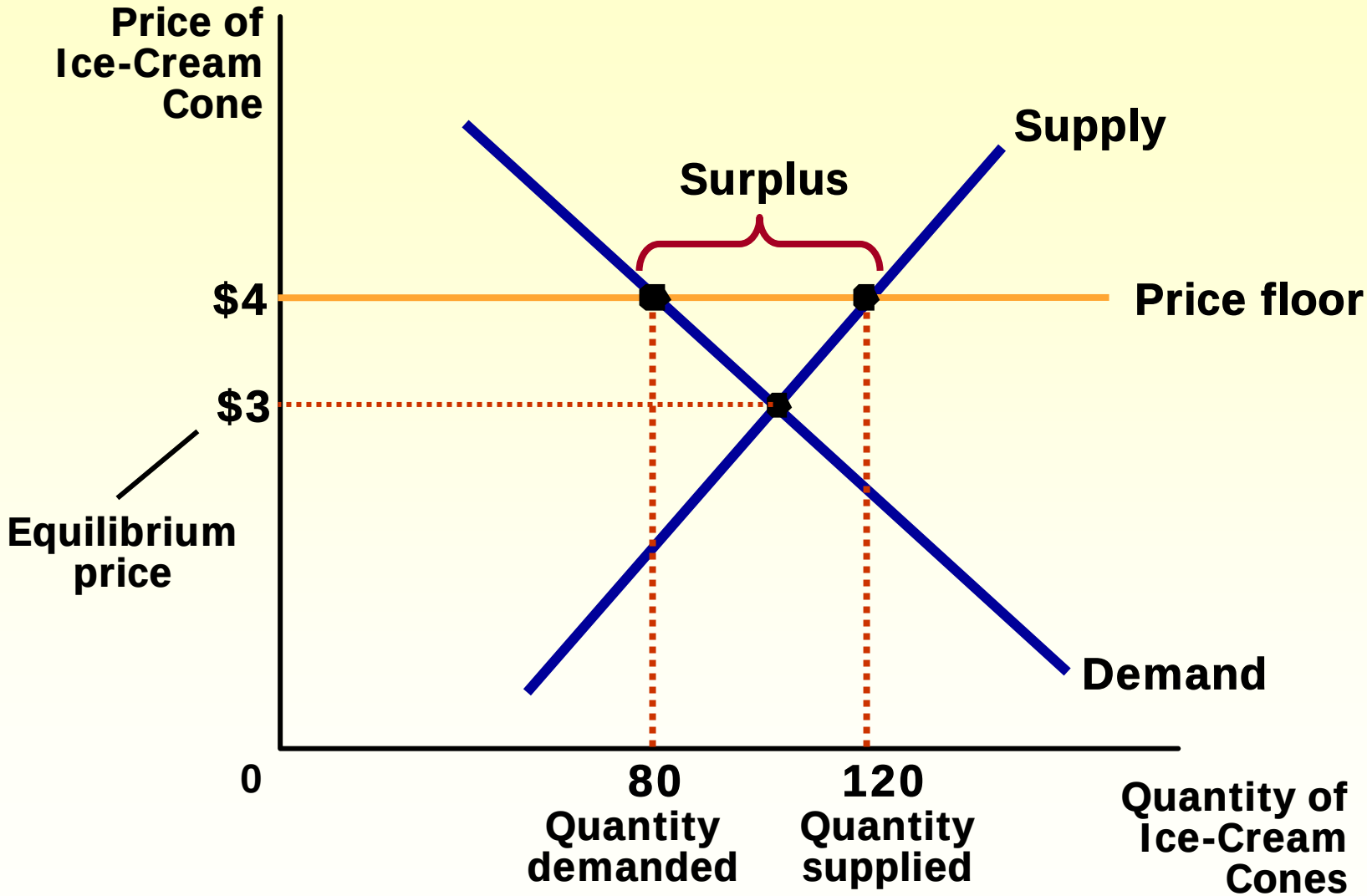
A Price Floor That Is Binding...



Effects of a Price Floor

- A price floor prevents supply and demand from moving toward the equilibrium price and quantity.
- When the market price hits the floor, it can fall no further, and the market price equals the floor price.

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Effects of a Price Floor

A binding price floor causes . . .

. . . a surplus because $Q_S > Q_D$.

. . . nonprice rationing is an alternative mechanism for rationing the good, using discrimination criteria.

- **Examples: The minimum wage, Agricultural price supports**

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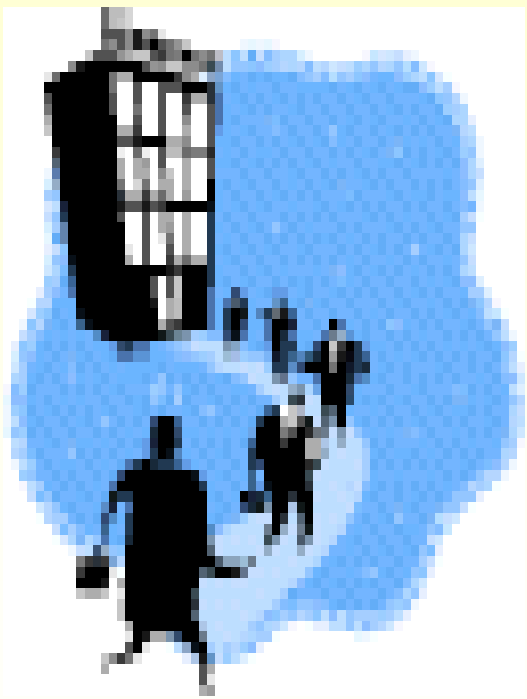
The Minimum Wage



An important example of a price floor is the minimum wage. Minimum wage laws dictate the lowest price possible for labor that any employer may pay.

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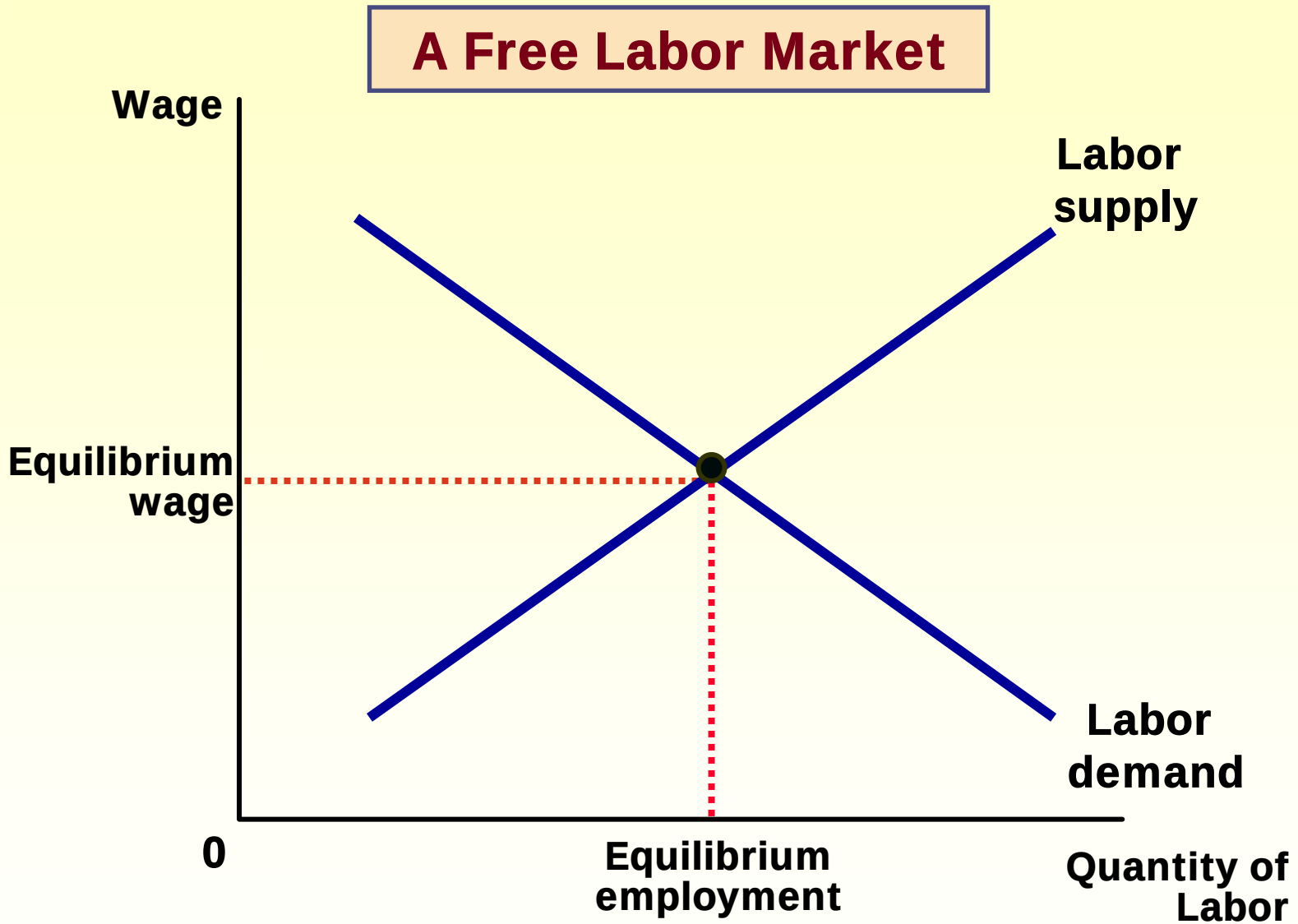
The Minimum Wage



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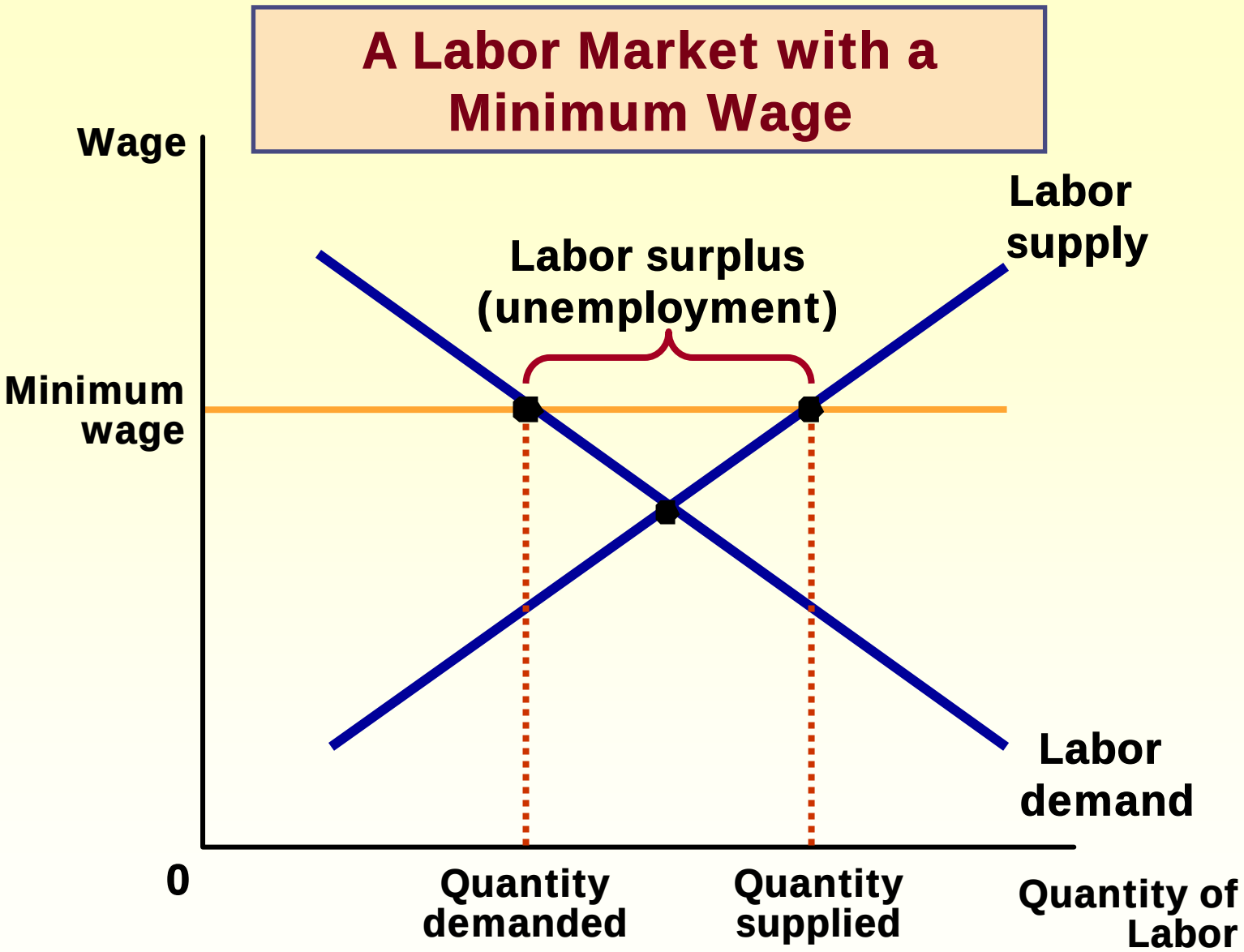
The Minimum Wage



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Taxes

Governments levy taxes to raise revenue for public projects.

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What are some potential impacts of taxes?

- Taxes discourage market activity.
- When a good is taxed, the quantity sold is smaller.
- Buyers and sellers share the tax burden.

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Taxes

- **Tax incidence** is the study of who bears the burden of a tax.
- Taxes result in a change in market equilibrium.
- Buyers pay more and sellers receive less, regardless of whom the tax is levied on.

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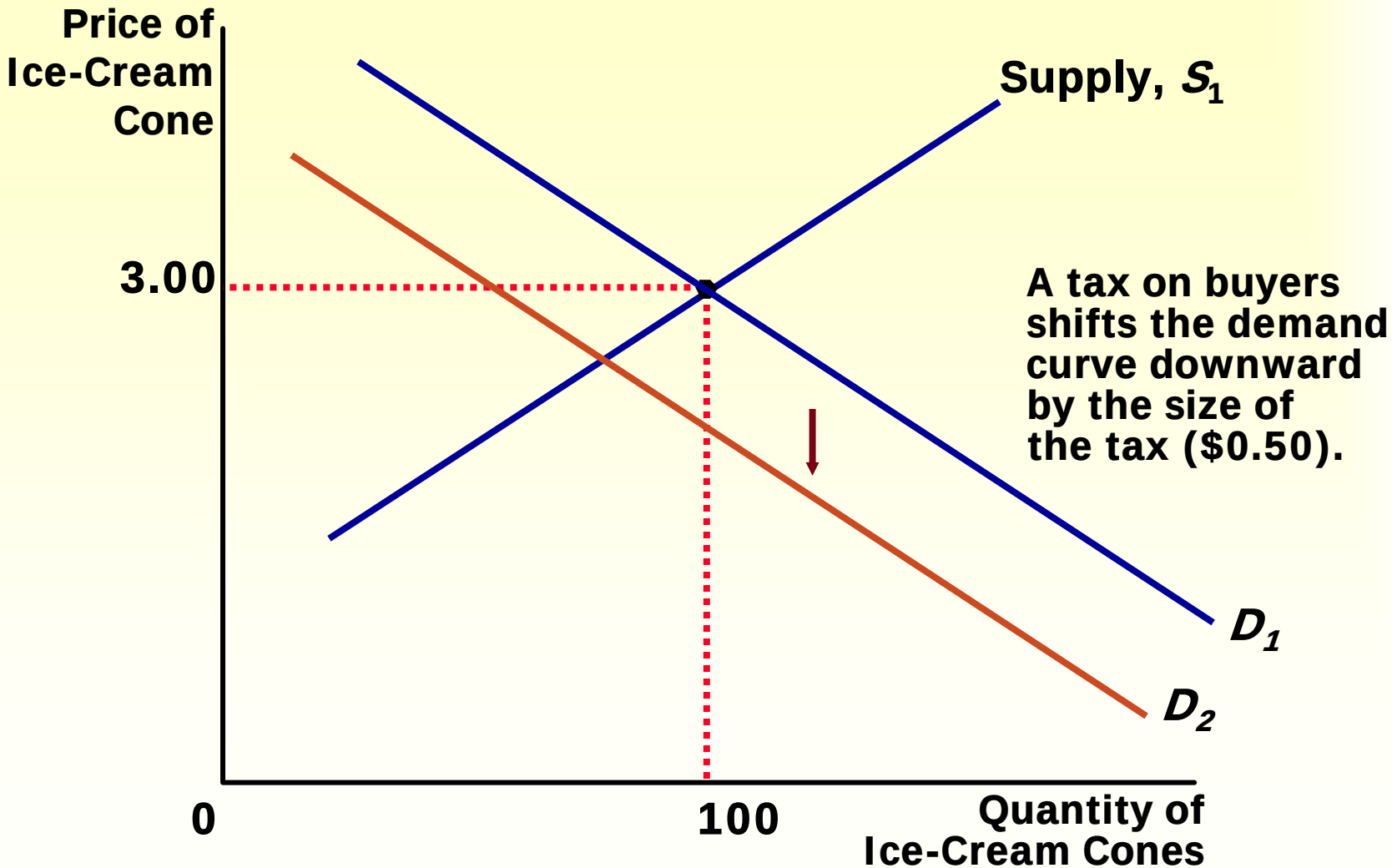
Impact of a 50¢ Tax Levied on Buyers...



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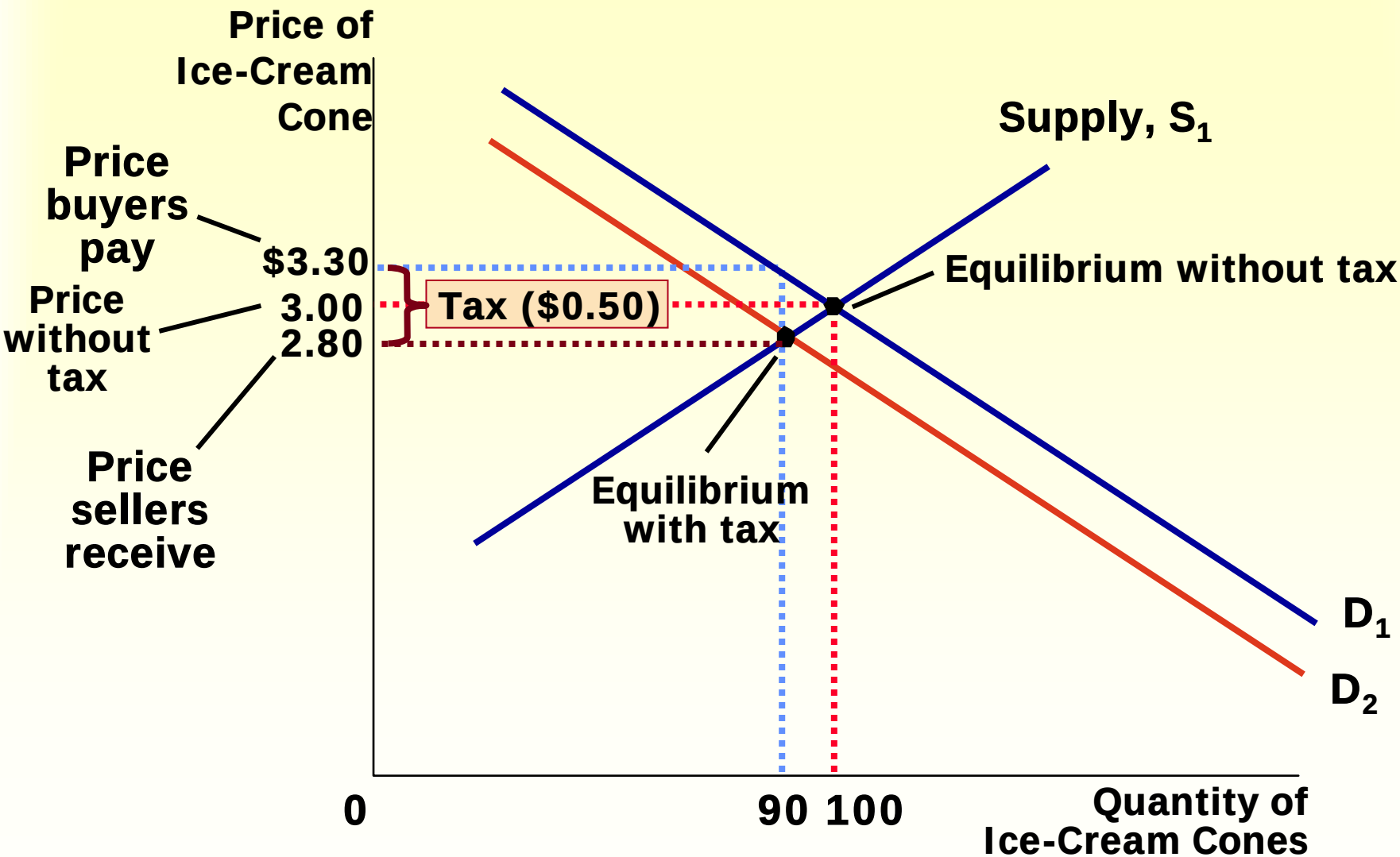
Impact of a 50¢ Tax Levied on Buyers...



What was the impact of tax?

- Taxes discourage market activity.
- When a good is taxed, the quantity sold is smaller.
- Buyers and sellers share the tax burden.

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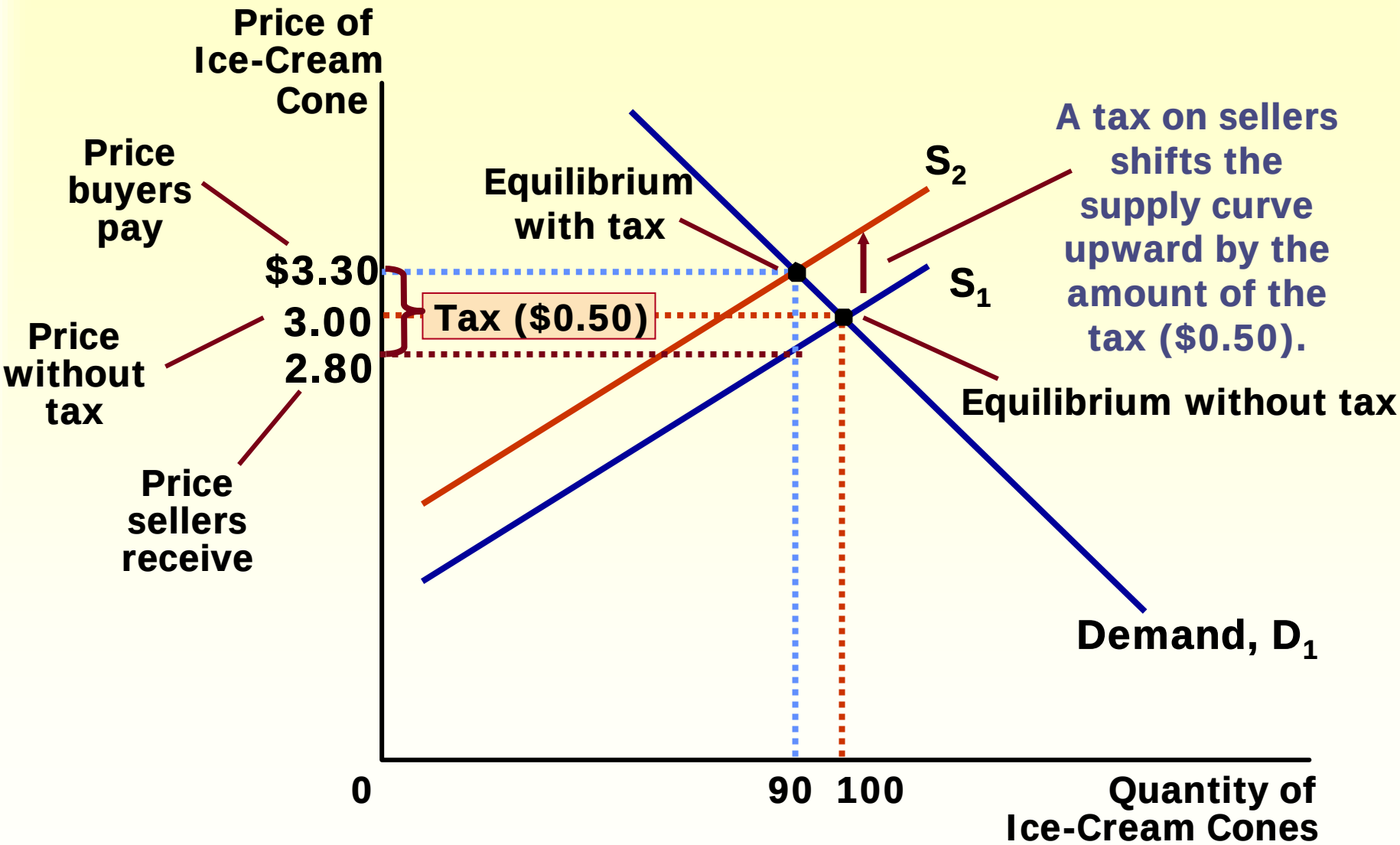
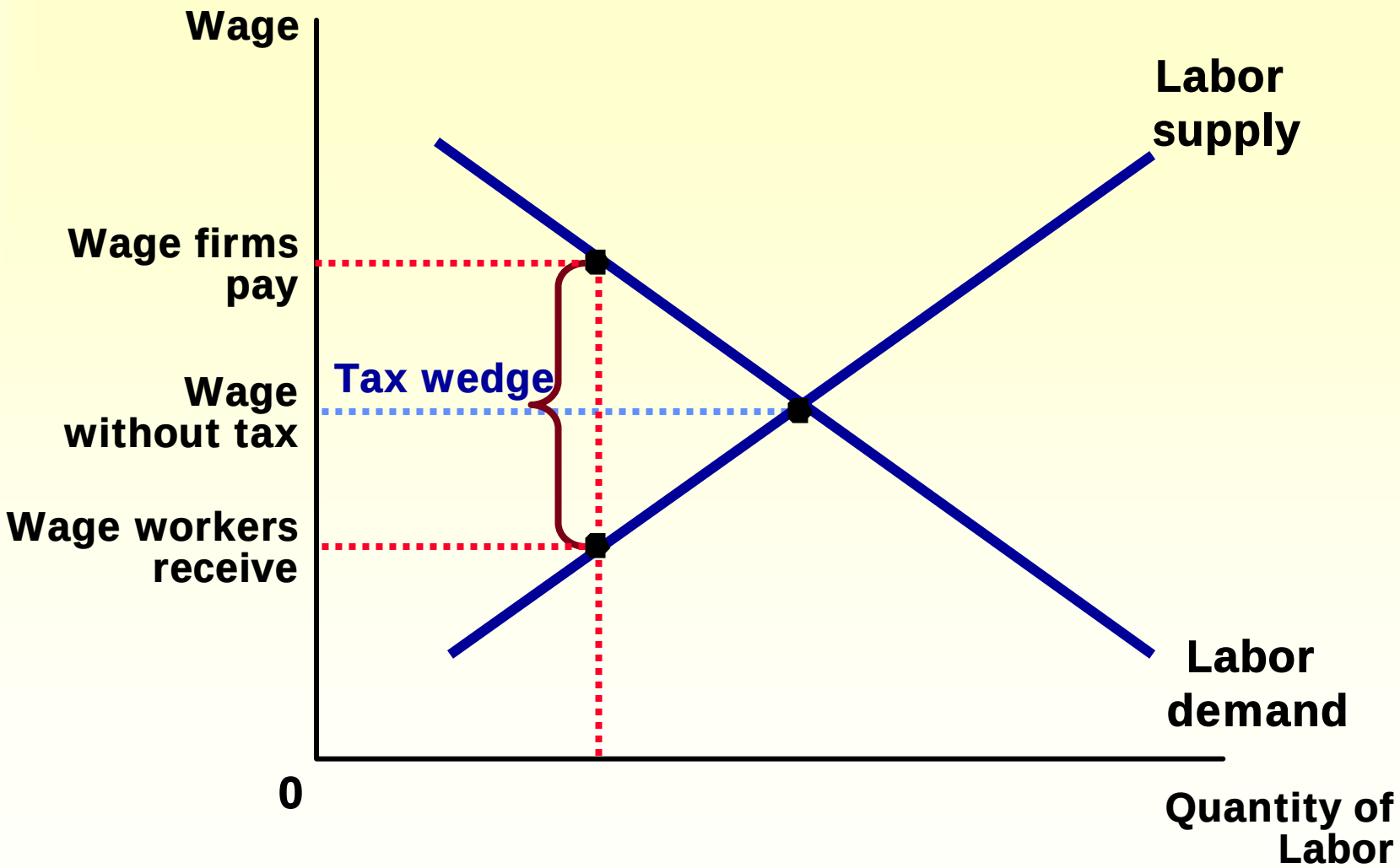
Impact of a 50¢ Tax on Sellers...



A Payroll Tax



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The Incidence of Tax

- In what proportions is the burden of the tax divided?
- How do the effects of taxes on sellers compare to those levied on buyers?

The answers to these questions depend on the elasticity of demand and the elasticity of supply.

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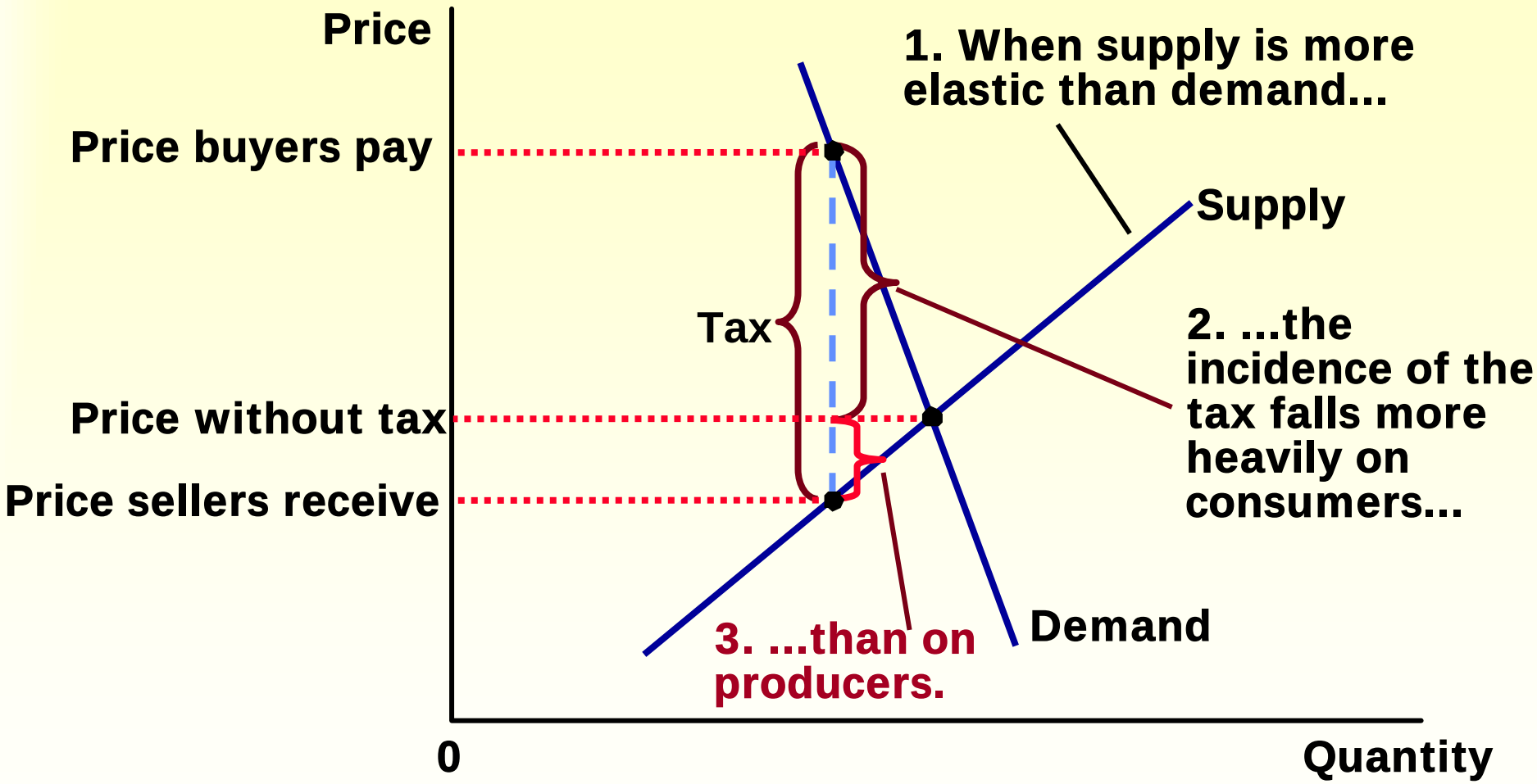
Elastic Supply, Inelastic Demand...



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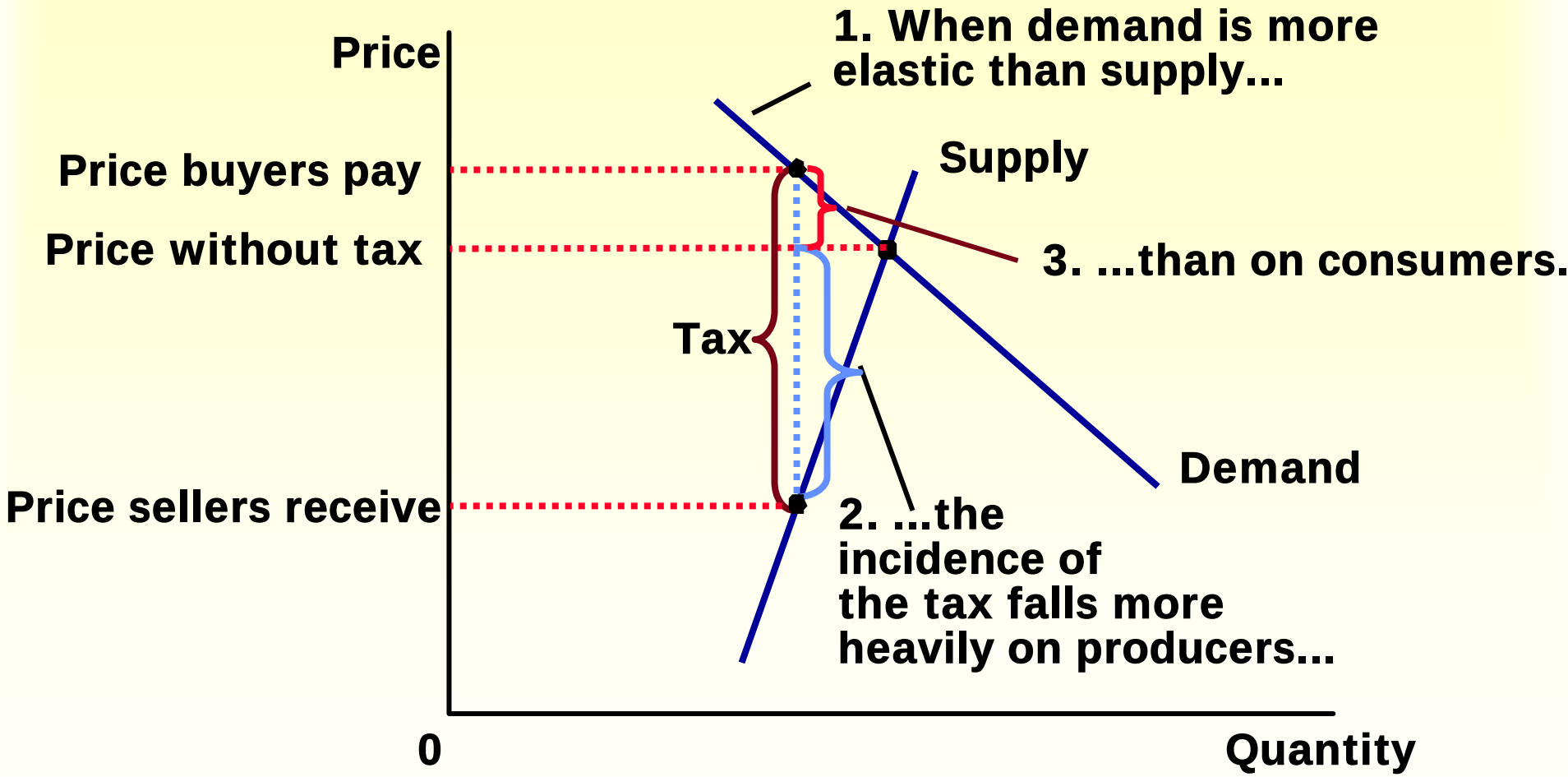
Inelastic Supply, Elastic Demand...



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So, how is the burden of the tax divided?

The burden of a tax falls more heavily on the side of the market that is less elastic.

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Summary

- Price controls include price ceilings and price floors.
- A price ceiling is a legal maximum on the price of a good or service. An example is rent control.
- A price floor is a legal minimum on the price of a good or a service. An example is the minimum wage.

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Summary

- Taxes are used to raise revenue for public purposes.
- When the government levies a tax on a good, the equilibrium quantity of the good falls.
- A tax on a good places a wedge between the price paid by buyers and the price received by sellers.

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Summary

- The incidence of a tax refers to who bears the burden of a tax.
- The incidence of a tax does not depend on whether the tax is levied on buyers or sellers.
- The incidence of the tax depends on the price elasticities of supply and demand.

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Graphical Review

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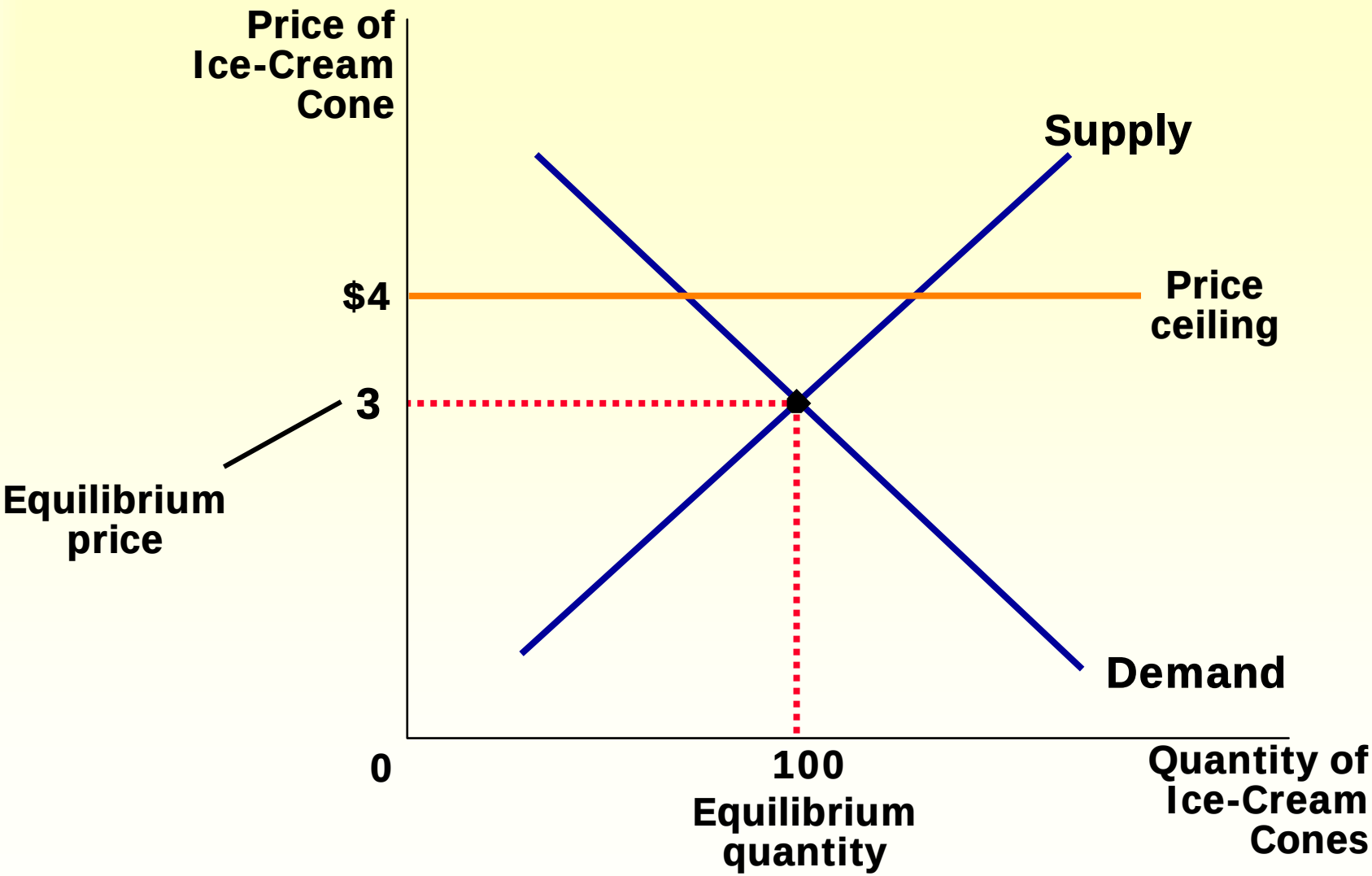
A Price Ceiling That Is Not Binding...



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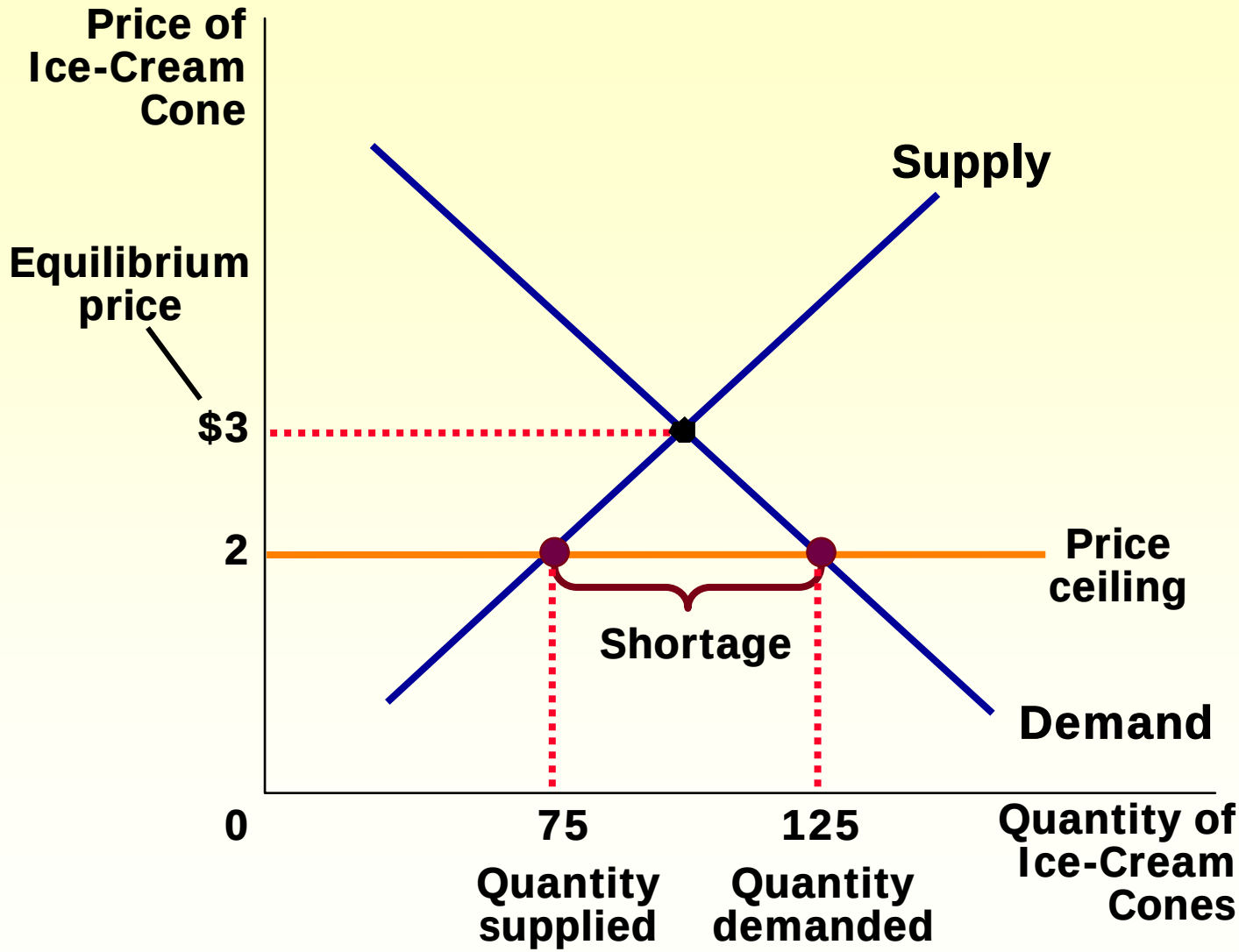
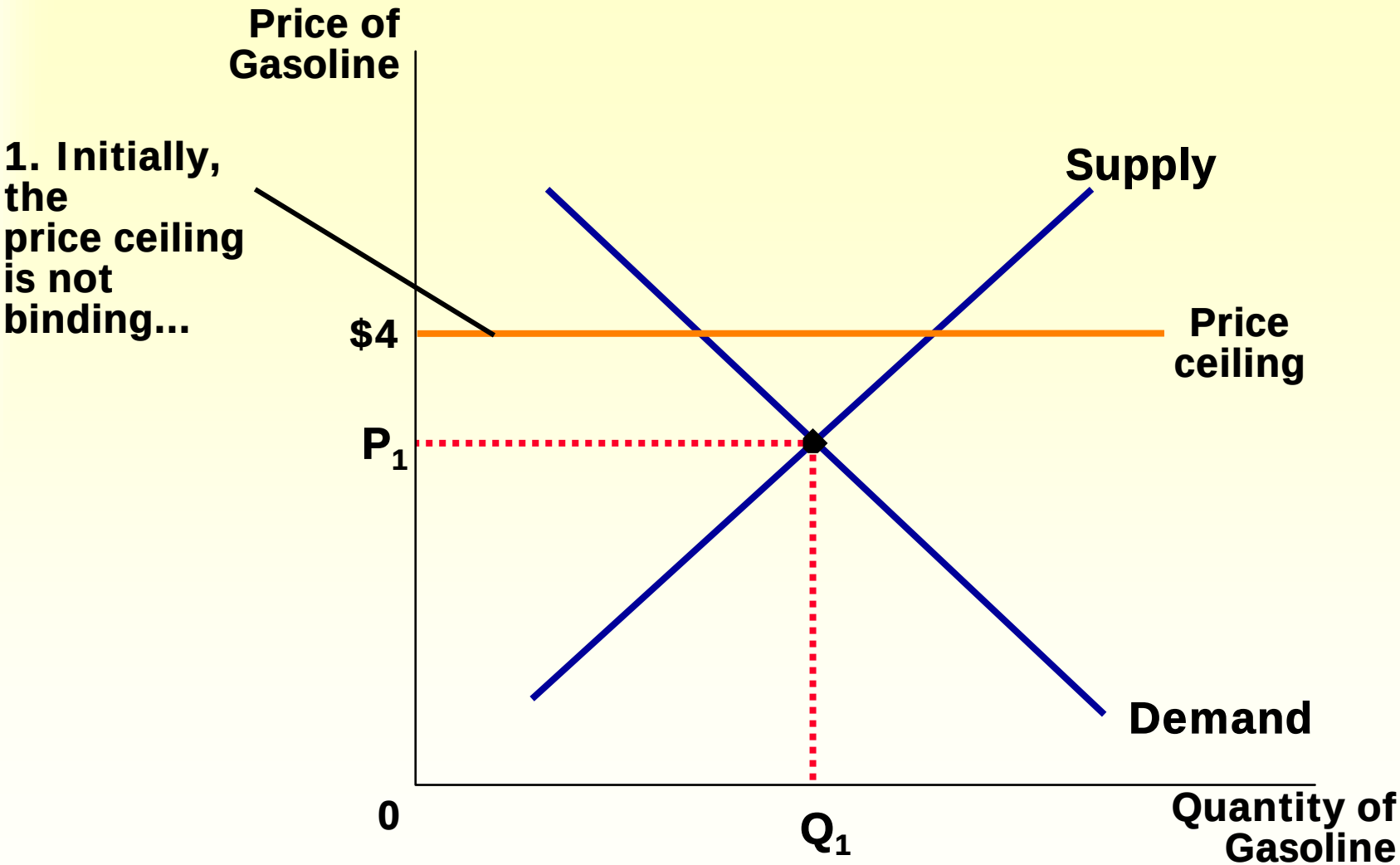


The Price Ceiling on Gasoline Is Not Binding...



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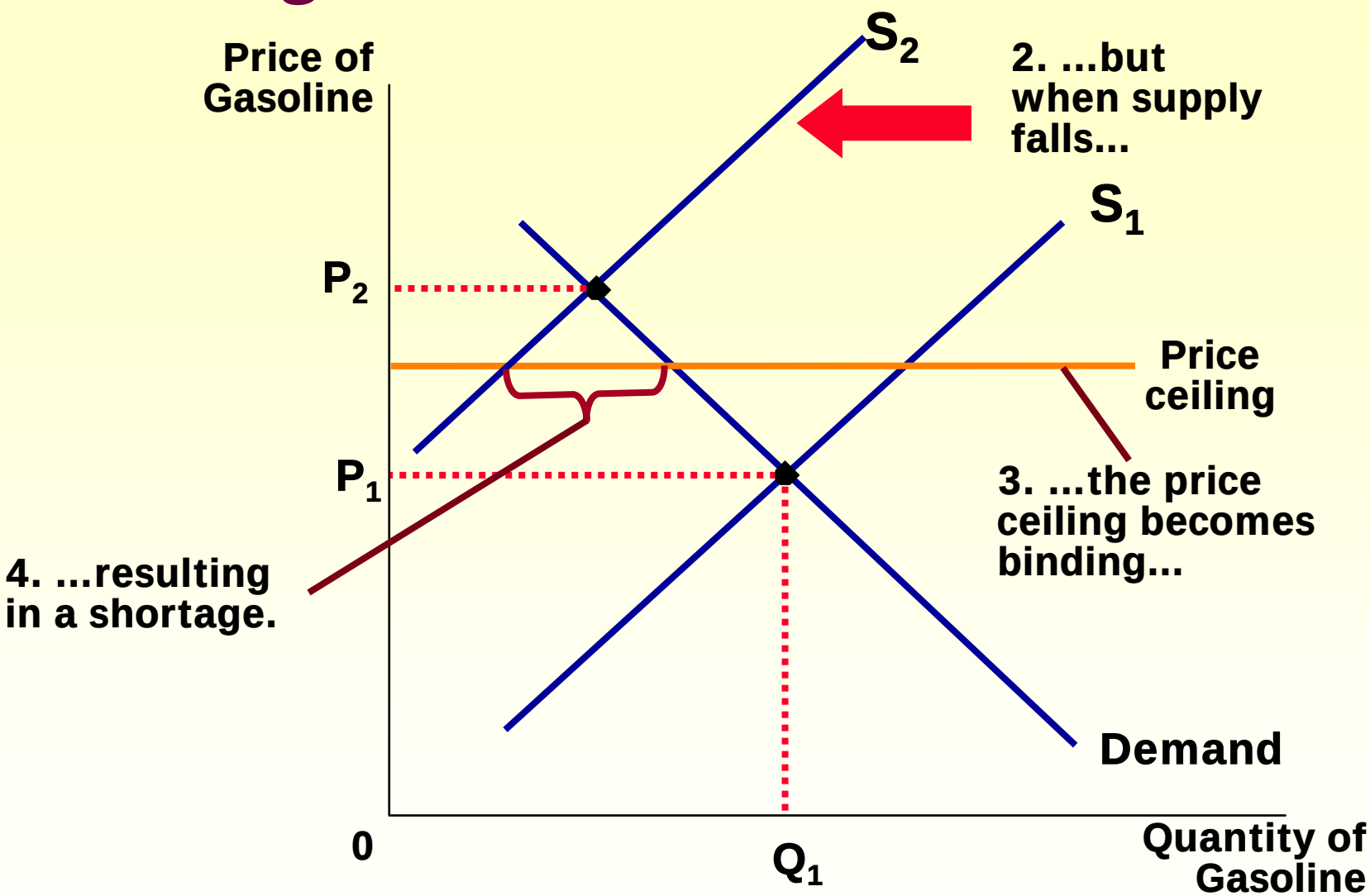

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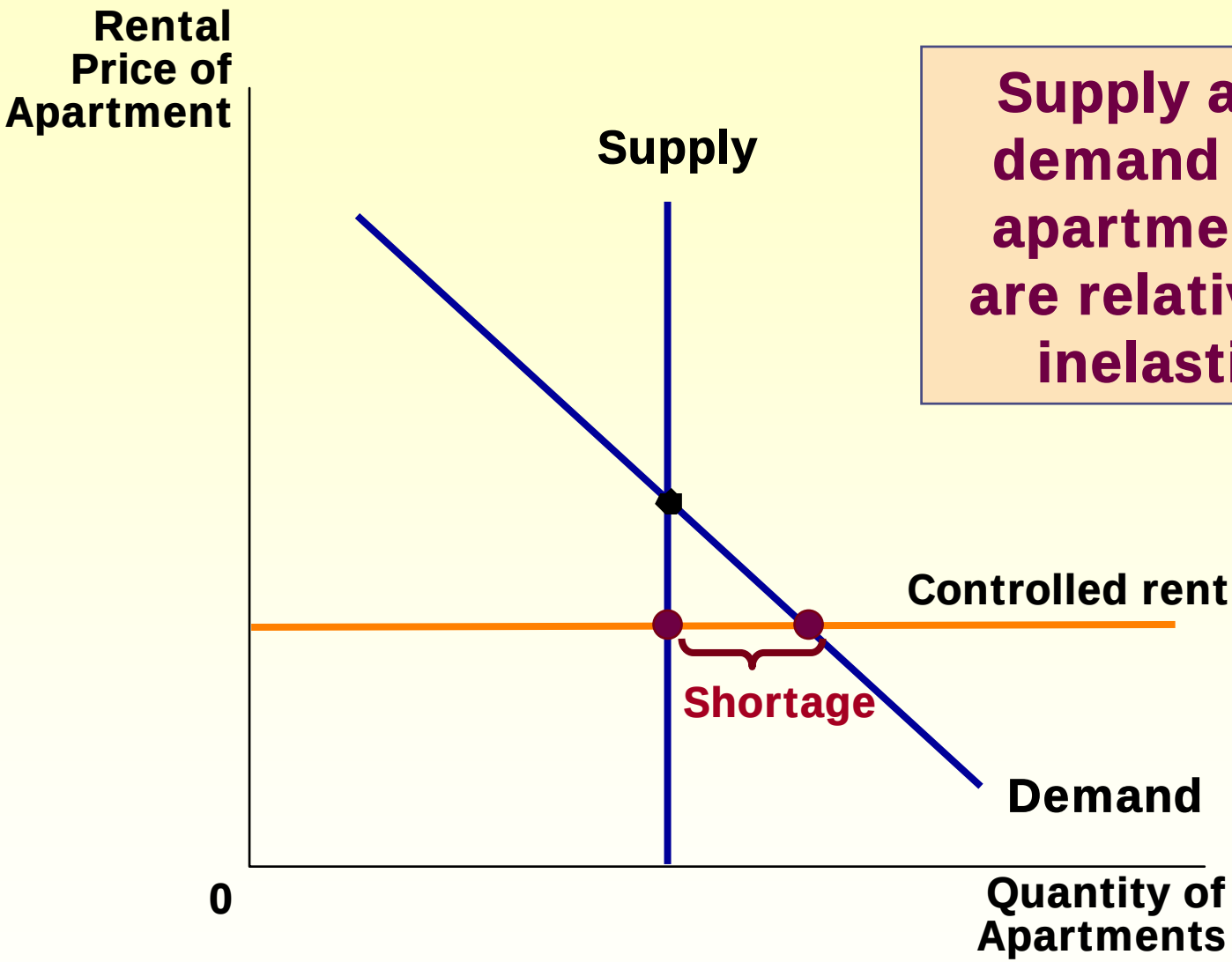
Rent Control in the Short Run...



Supply and demand for apartments are relatively inelastic

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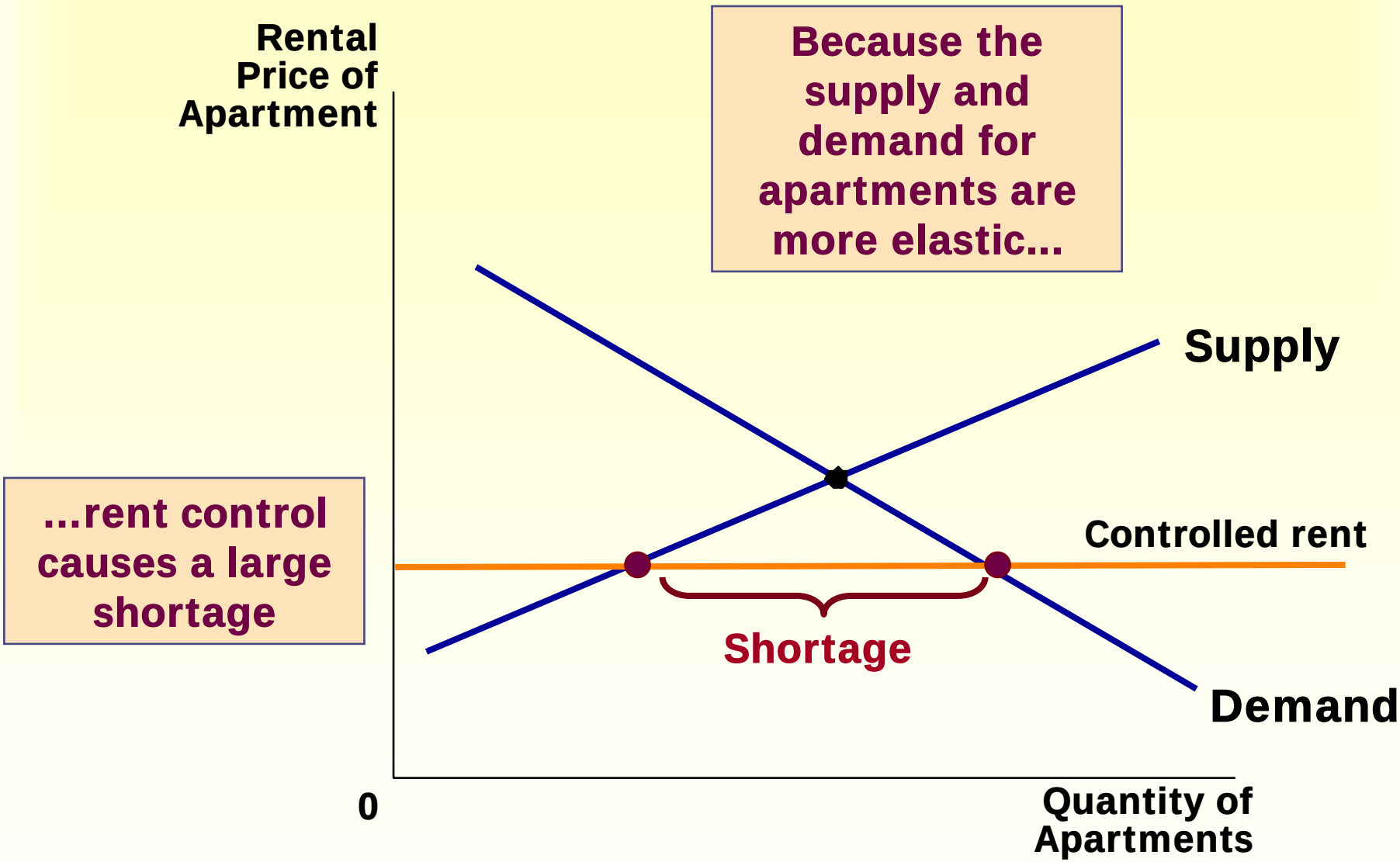
Rent Control in the Long Run...



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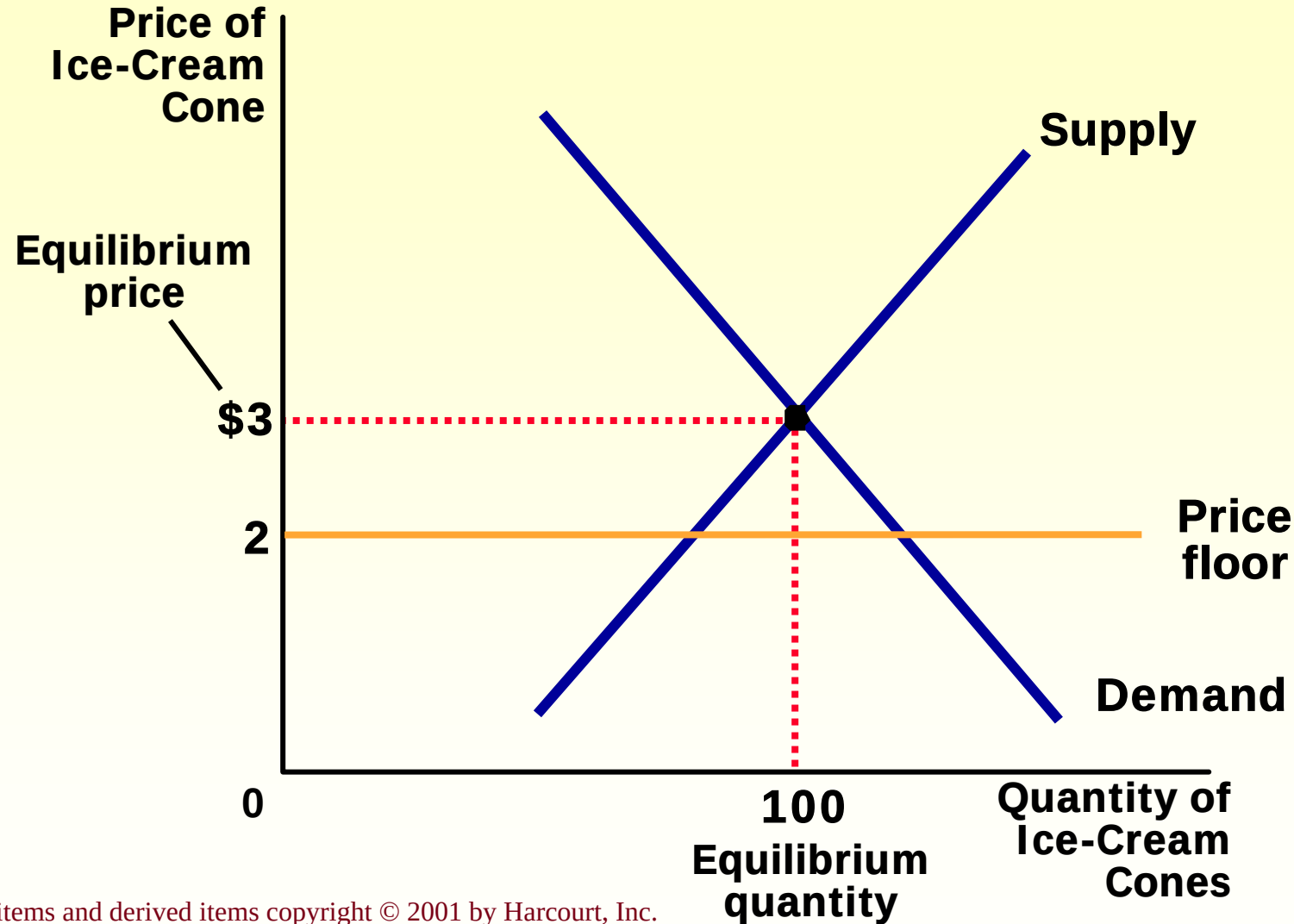

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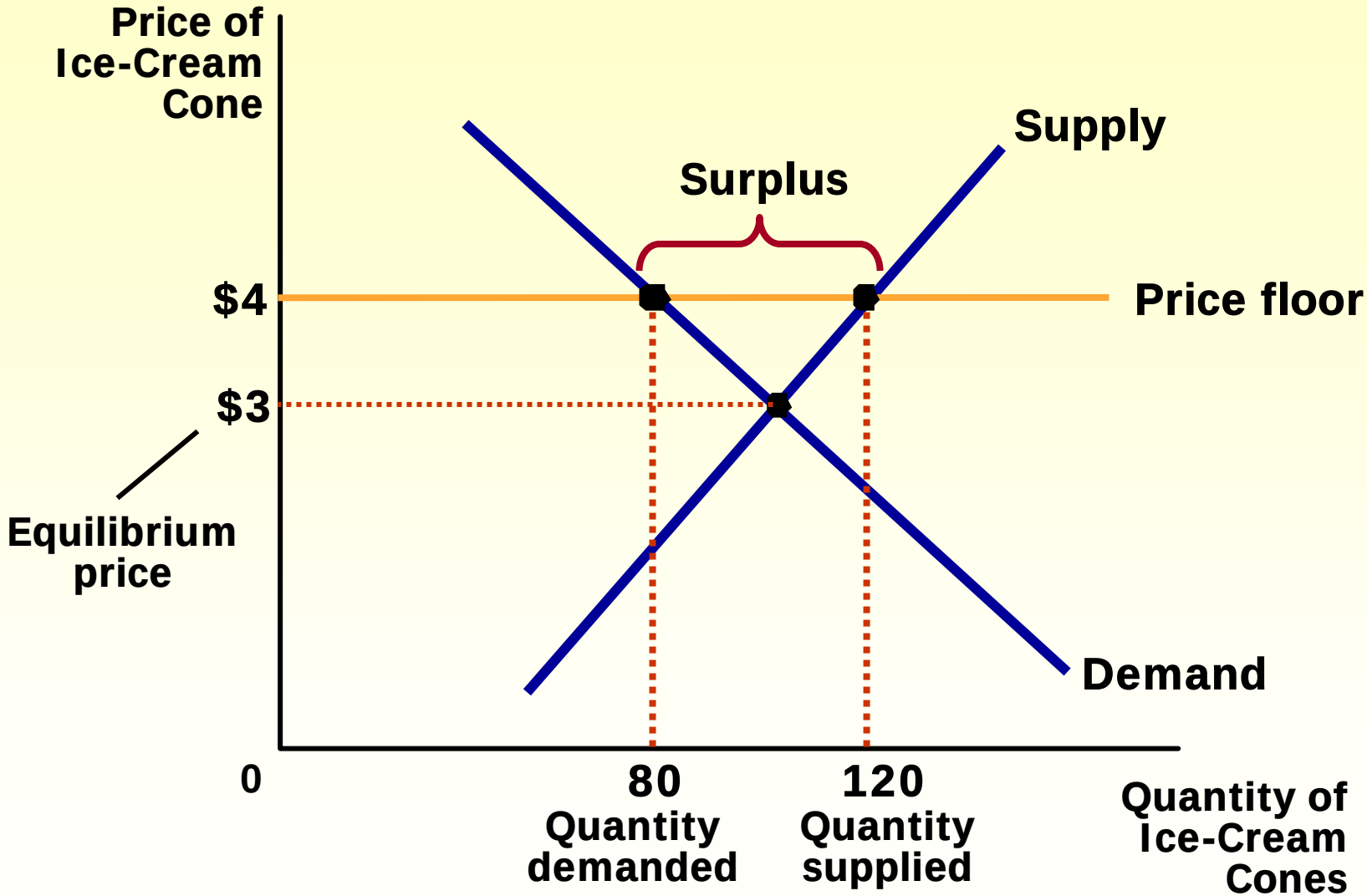
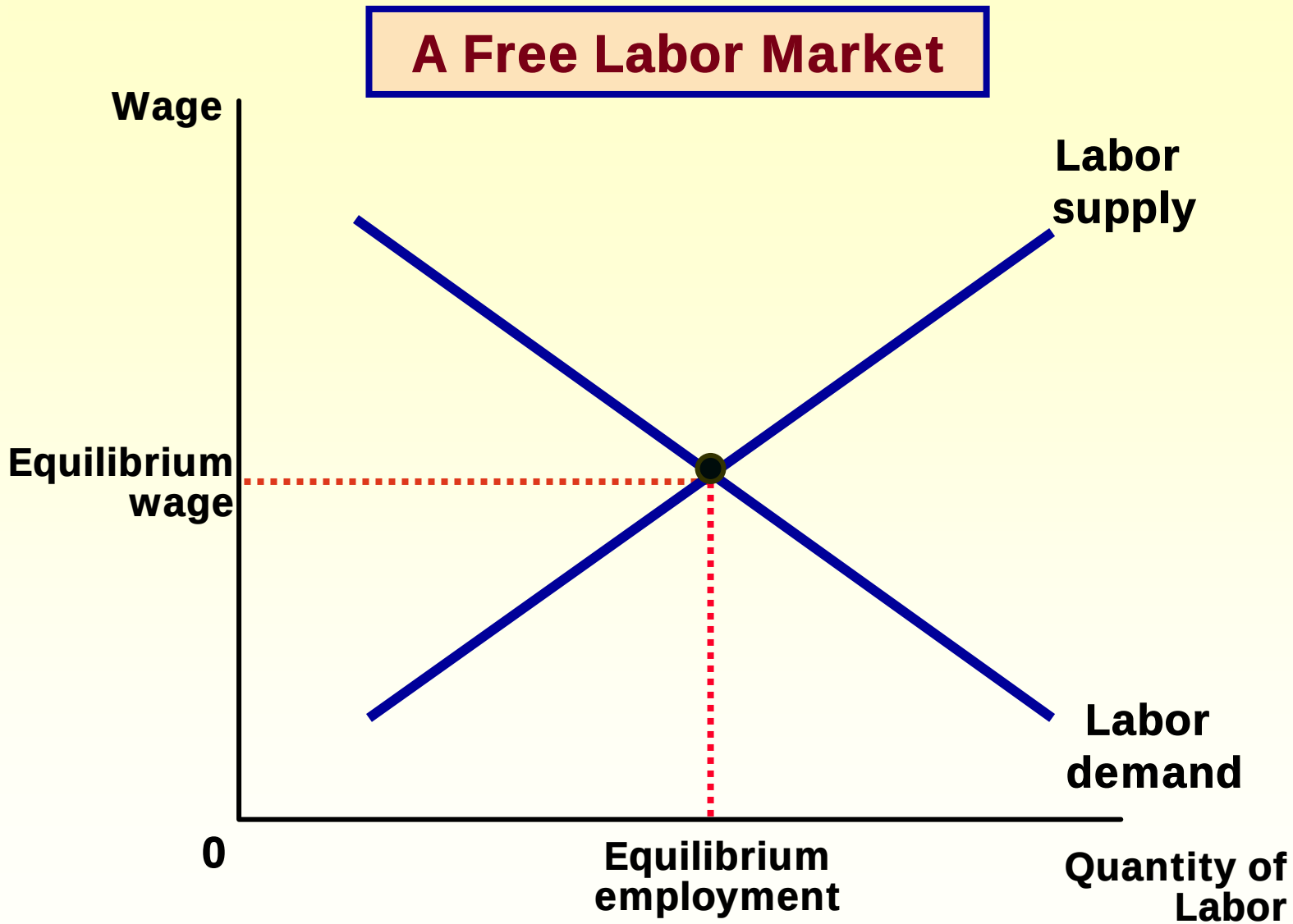


The Minimum Wage



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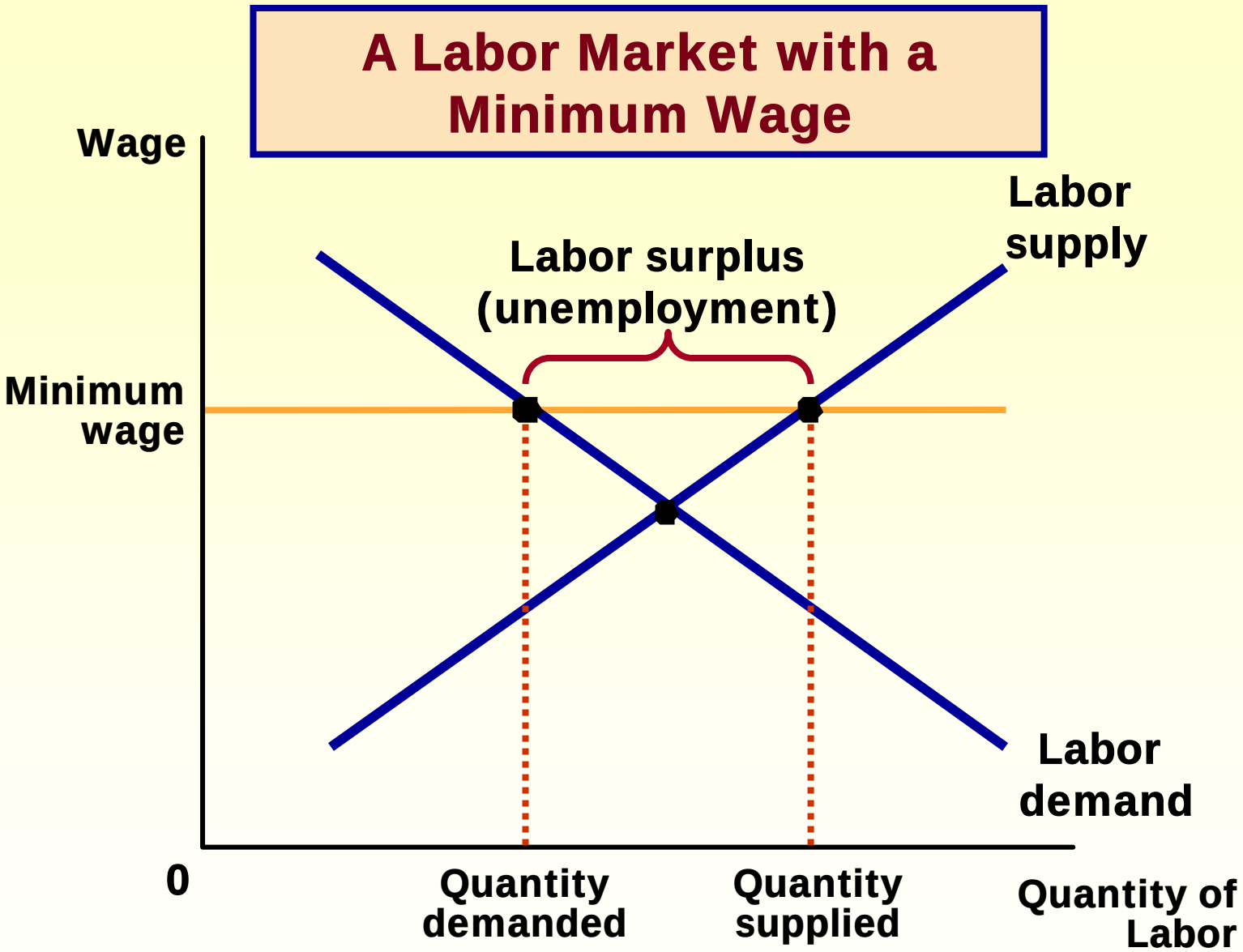

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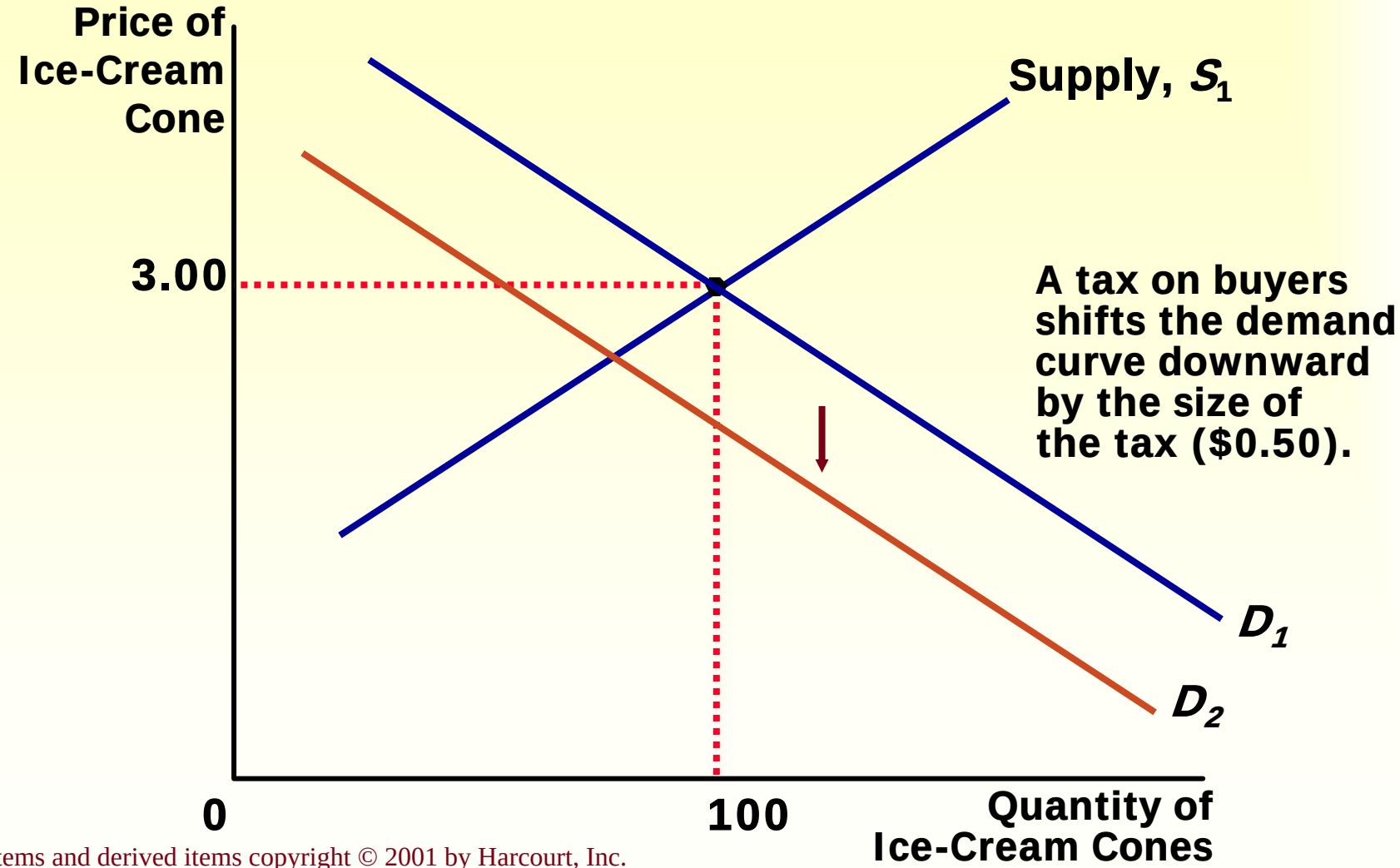
Impact of a 50¢ Tax Levied on Buyers...



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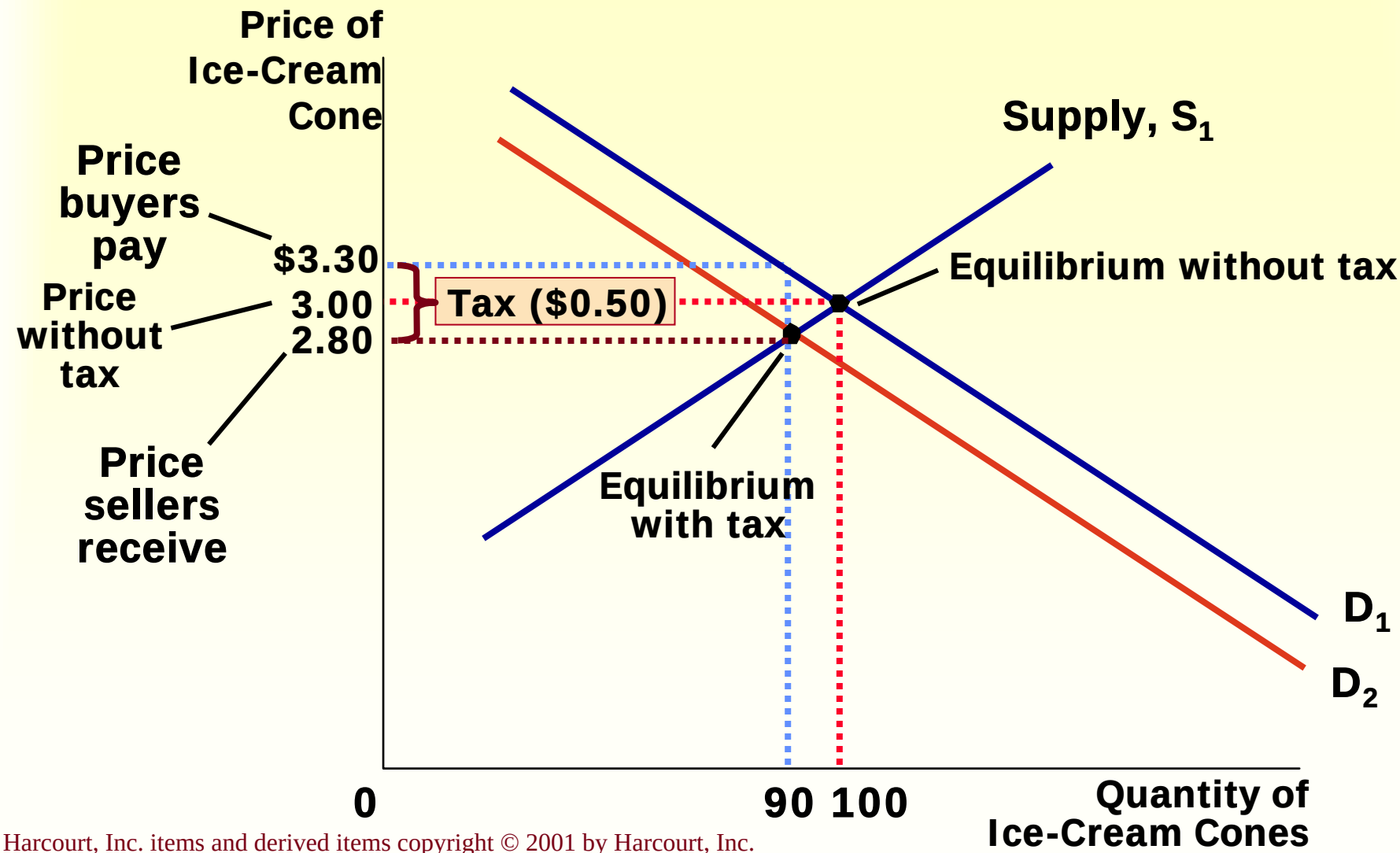

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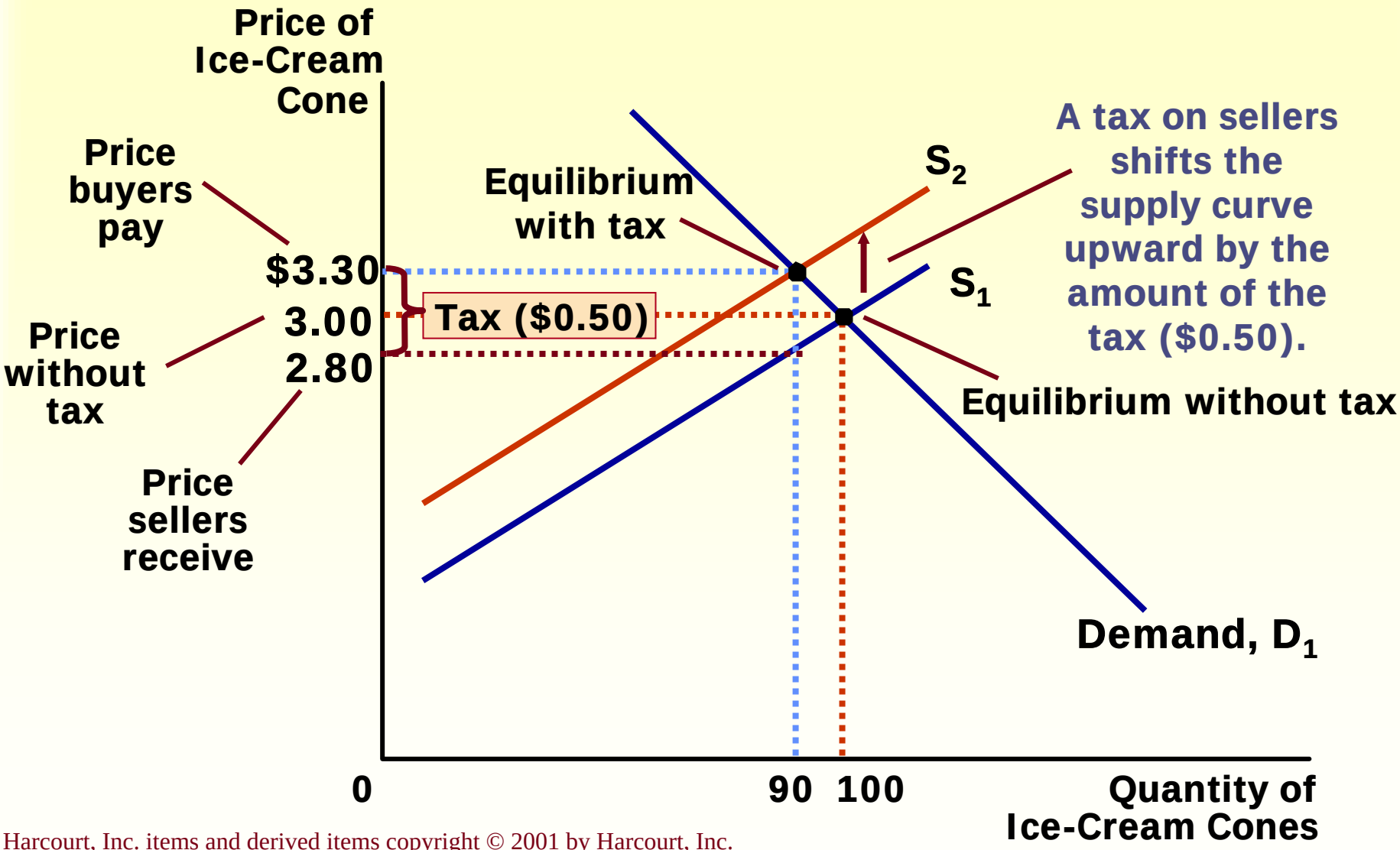
Impact of a 50¢ Tax on Sellers...



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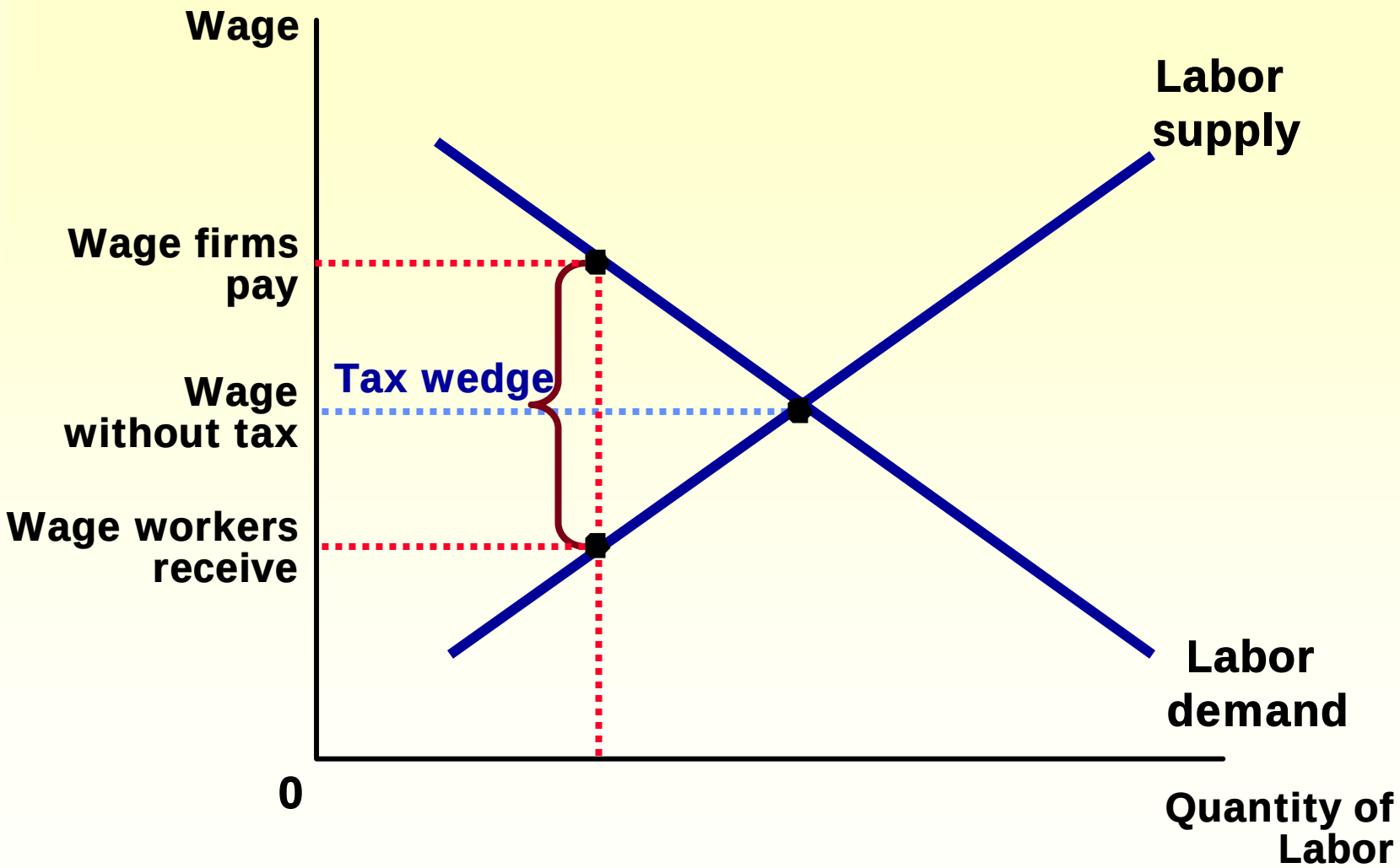
A Payroll Tax



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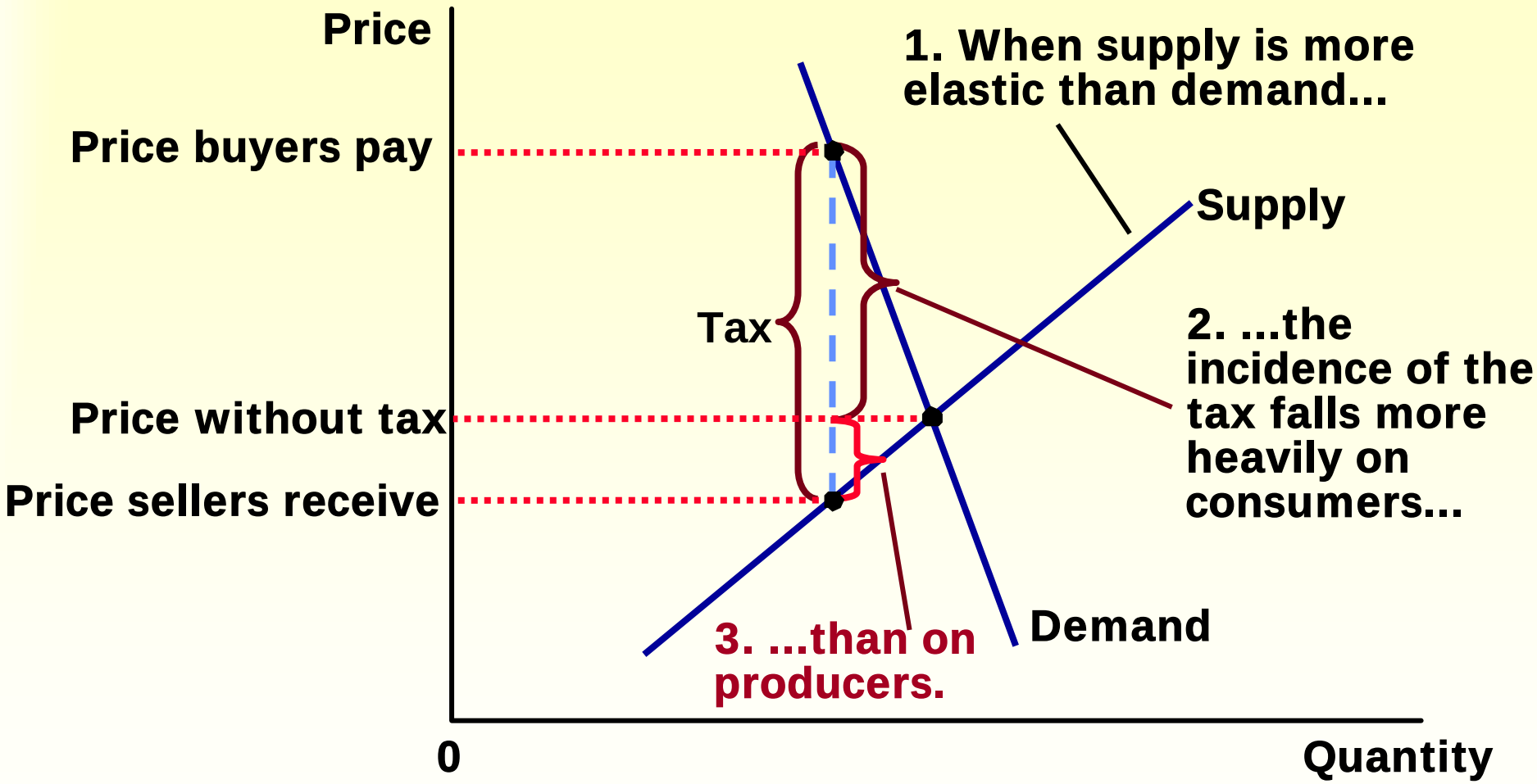
Elastic Supply, Inelastic Demand...



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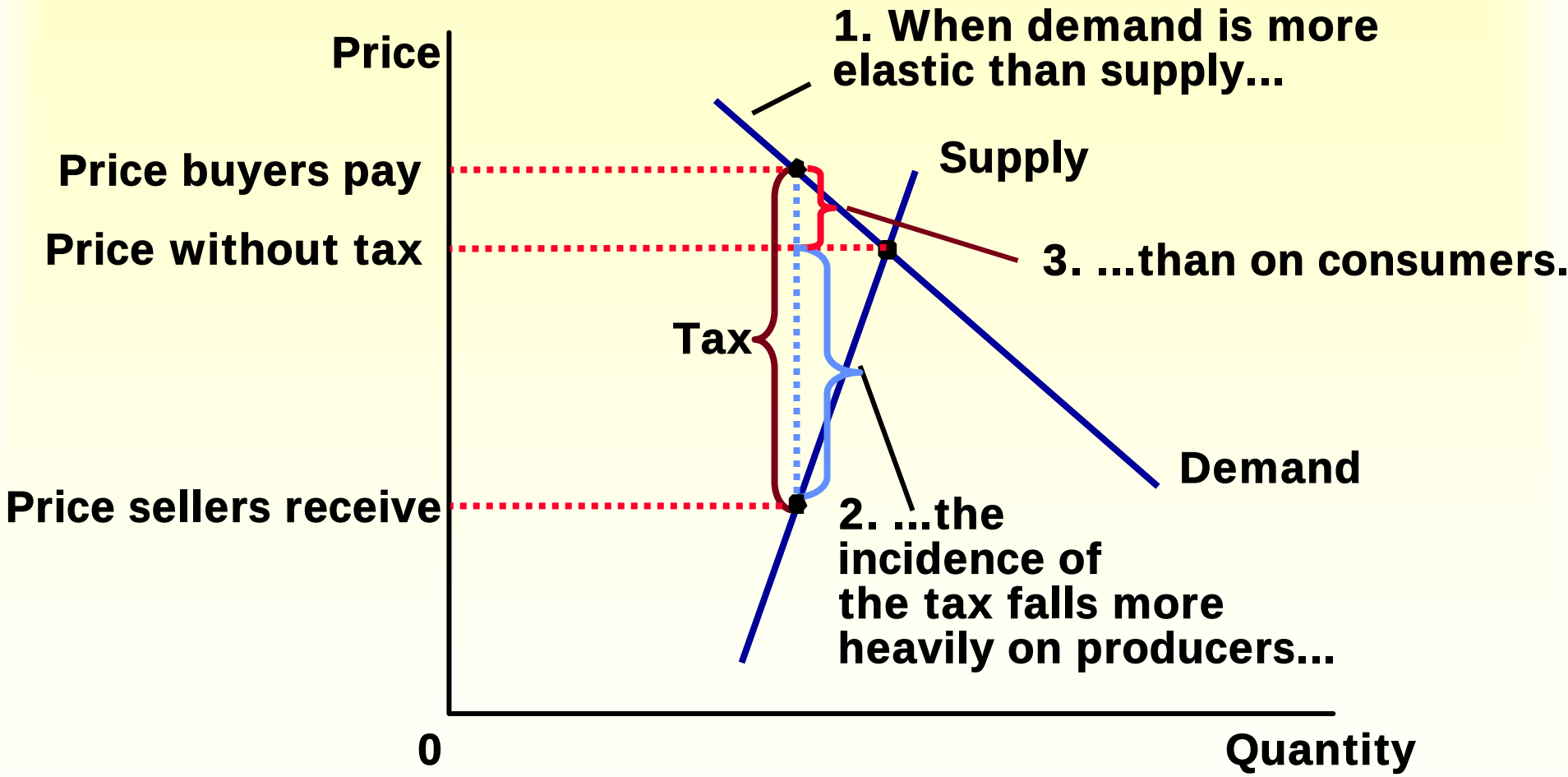

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Consumers, Producers, and the Efficiency of Markets

Chapter 7

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Revisiting the Market Equilibrium

Do the equilibrium price and quantity maximize the total welfare of buyers and sellers?

- **Market equilibrium reflects the way markets allocate scarce resources.**
- **Whether the market allocation is desirable is determined by welfare economics.**

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Welfare Economics

Welfare economics is the study of how the allocation of resources affects economic well-being.

- Buyers and sellers receive benefits from taking part in the market.
- The equilibrium in a market maximizes the total welfare of buyers and sellers.

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Welfare Economics

Equilibrium in the market results in maximum benefits, and therefore maximum total welfare for both the consumers and the producers of the product.

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Welfare Economics

- Consumer surplus measures economic welfare from the buyer's side.
- Producer surplus measures economic welfare from the seller's side.

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Consumer Surplus

- **Willingness to pay** is the maximum price that a buyer is willing and able to pay for a good.
- It measures how much the buyer values the good or service.

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Consumer Surplus

Consumer surplus is the amount a buyer is willing to pay for a good minus the amount the buyer actually pays for it.

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Four Possible Buyers' Willingness to Pay...

Buyer	Willingness to Pay
John	$100
Paul	80
George	70
Ringo	50

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Consumer Surplus

The market demand curve depicts the various quantities that buyers would be willing and able to purchase at different prices.

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Four Possible Buyers' Willingness to Pay...

Price	Buyer	Quantity Demanded
More than $100	None	0
$80 to $100	John	1
$70 to $80	John, Paul	2
$50 to $70	John, Paul, George	3
$50 or less	Ringo	4

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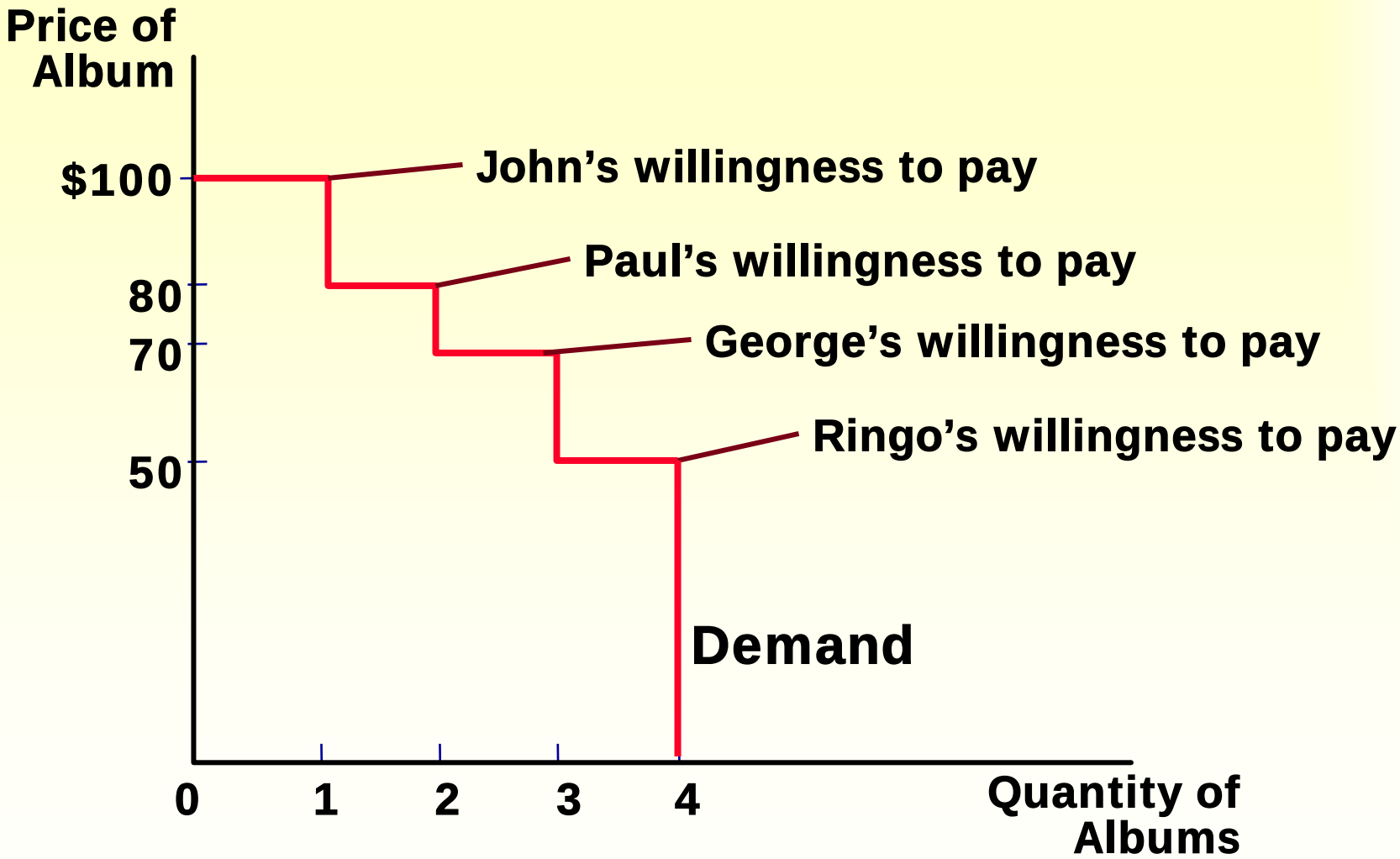
Measuring Consumer Surplus with the Demand Curve...



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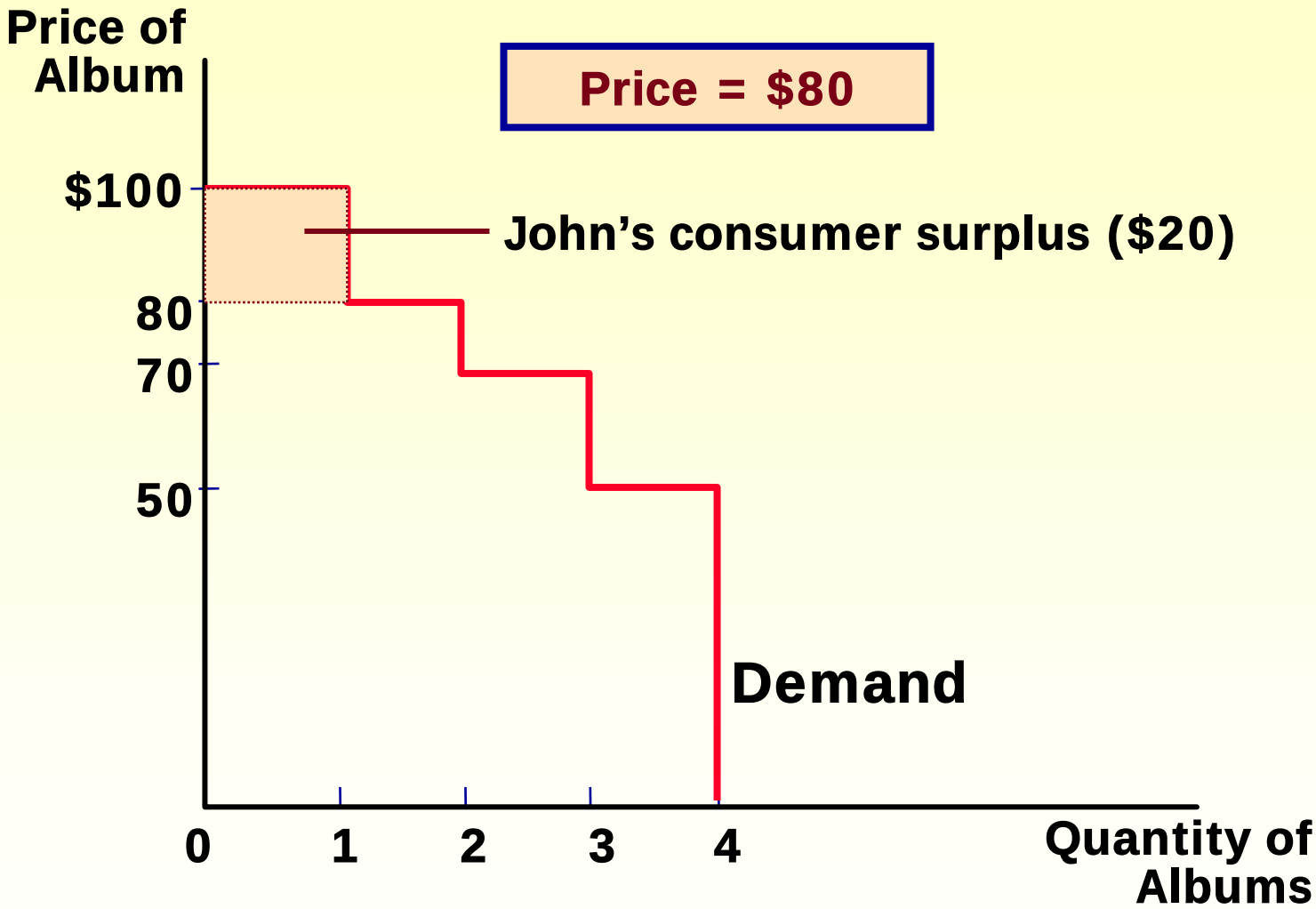
Measuring Consumer Surplus with the Demand Curve...



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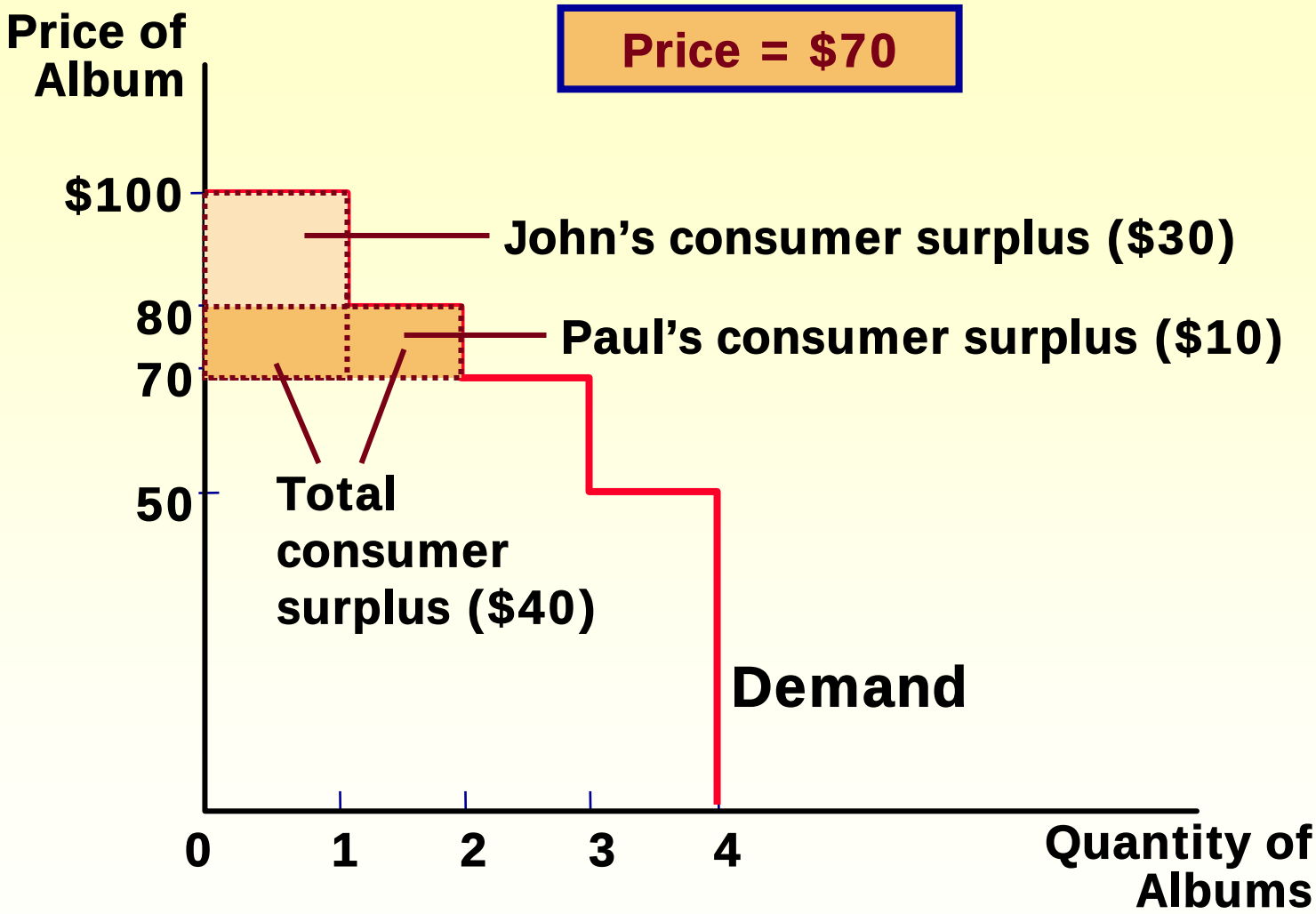

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Measuring Consumer Surplus with the Demand Curve

The area below the demand curve and above the price measures the consumer surplus in the market.

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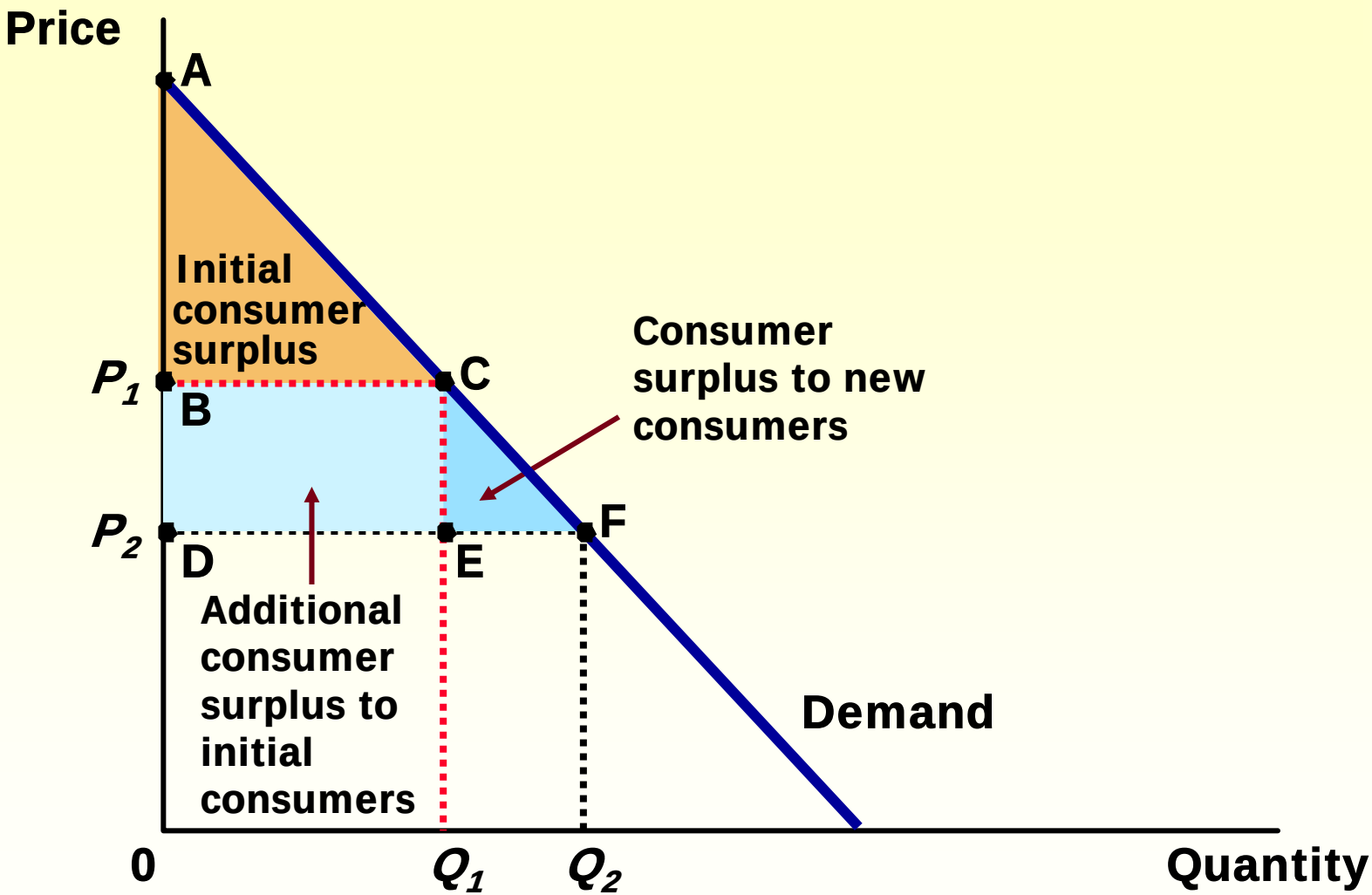
How the Price Affects Consumer Surplus...



Consumer Surplus and Economic Well-Being

Consumer surplus, the amount that buyers are willing to pay for a good minus the amount they actually pay for it, measures the benefit that buyers receive from a good as the buyers themselves perceive it.

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Producer Surplus

- **Producer surplus** is the amount a seller is paid minus the cost of production.
- It measures the benefit to sellers participating in a market.

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The Costs of Four Possible Sellers...

Seller	Cost
Mary	$900
Frida	800
Georgia	600
Grandma	500

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Producer Surplus and the Supply Curve

- Just as consumer surplus is related to the demand curve, producer surplus is closely related to the supply curve.
- At any quantity, the price given by the supply curve shows the cost of the ***marginal seller,*** the seller who would leave the market first if the price were any lower.

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Supply Schedule for the Four Possible Sellers...

Price	Sellers	Quantity Supplied
$900 or more	Mary, Frida, Georgia, Grandma	4
$800 to $900	Frida, Georgia, Grandma	3
$600 to $800	Georgia, Grandma	2
$500 to $600	Grandma	1
Less than $500	None	0

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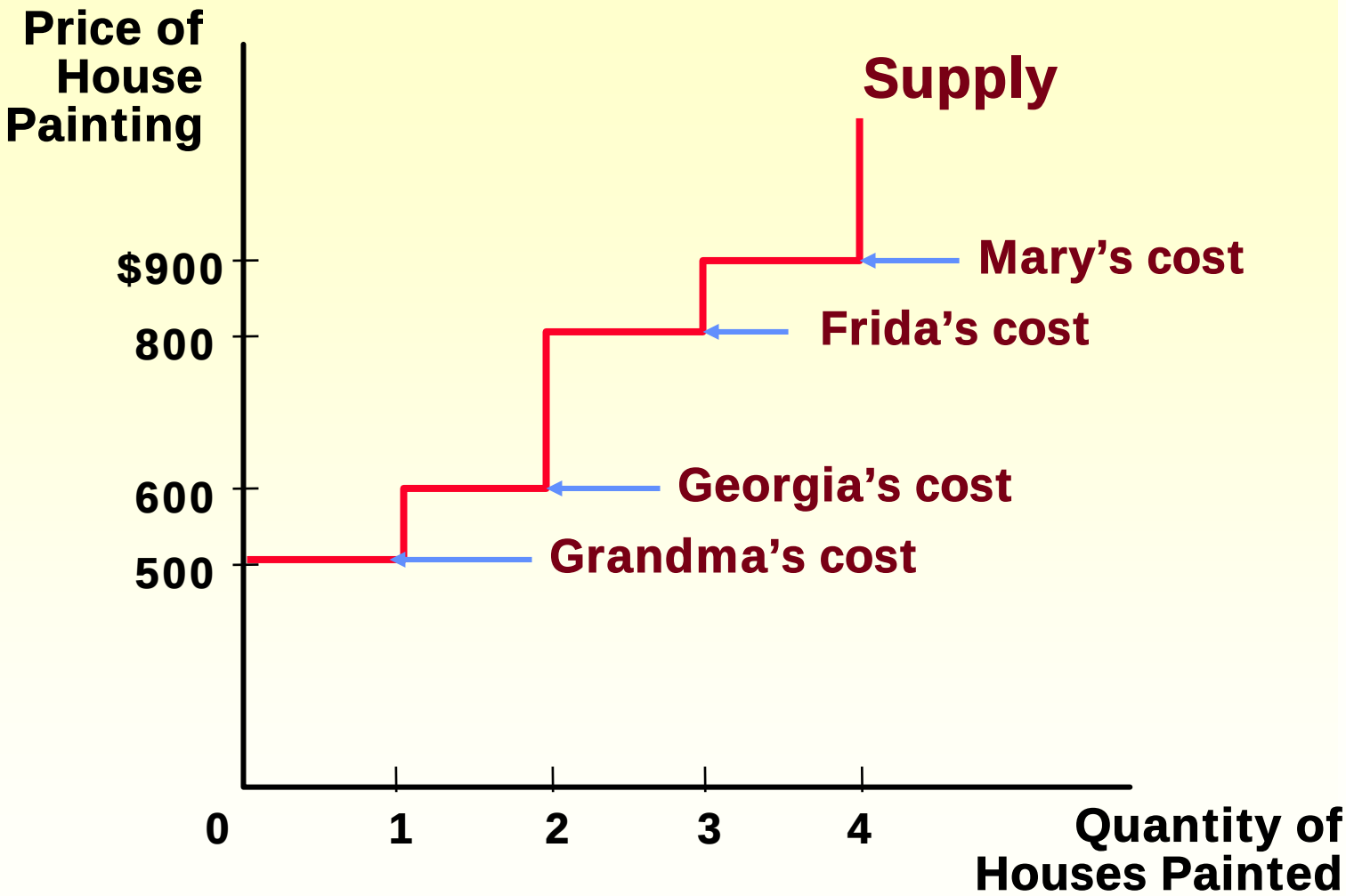
Producer Surplus and the Supply Curve...



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Producer Surplus and the Supply Curve

The area below the price and above the supply curve measures the producer surplus in a market.

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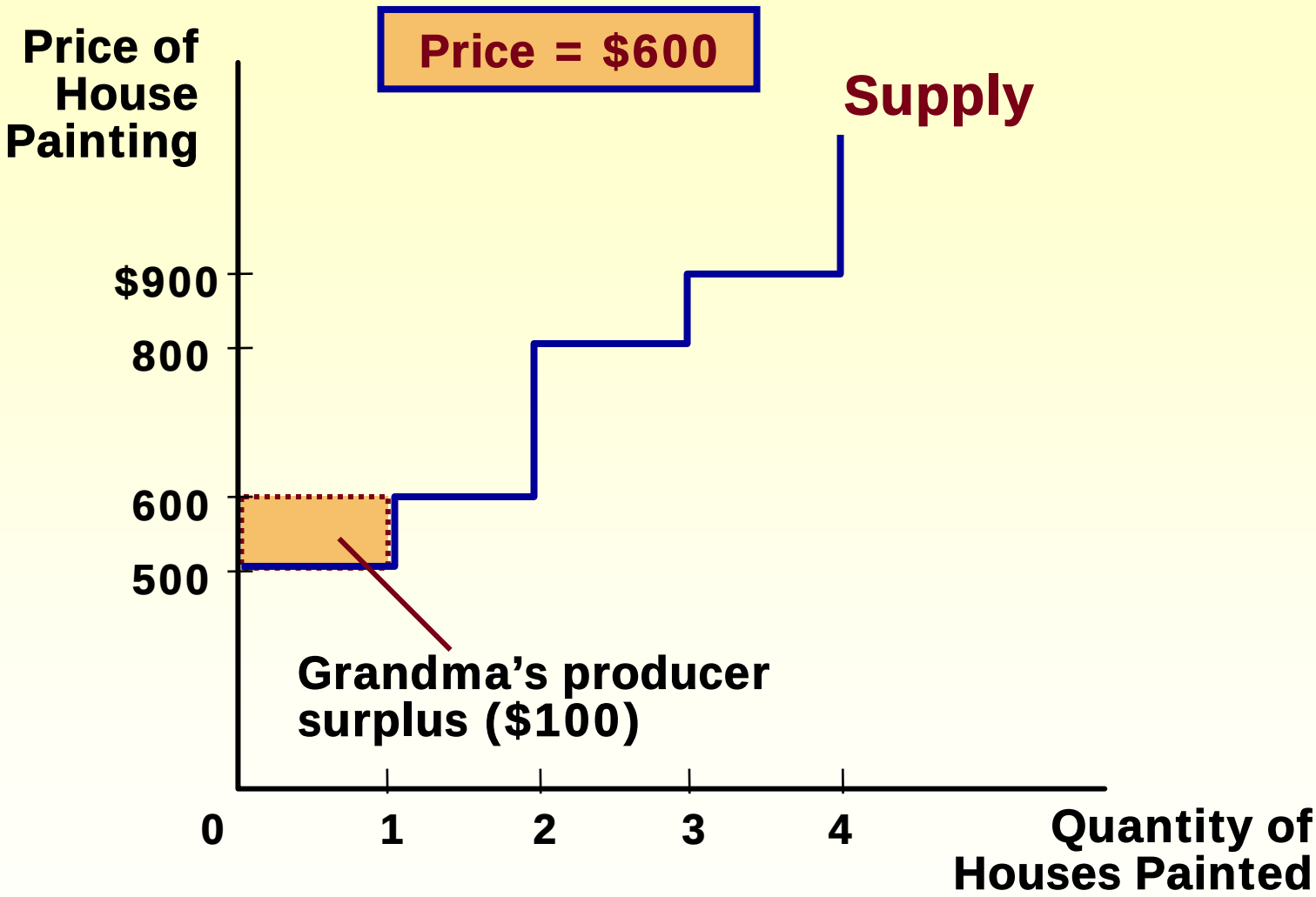
Measuring Producer Surplus with the Supply Curve...



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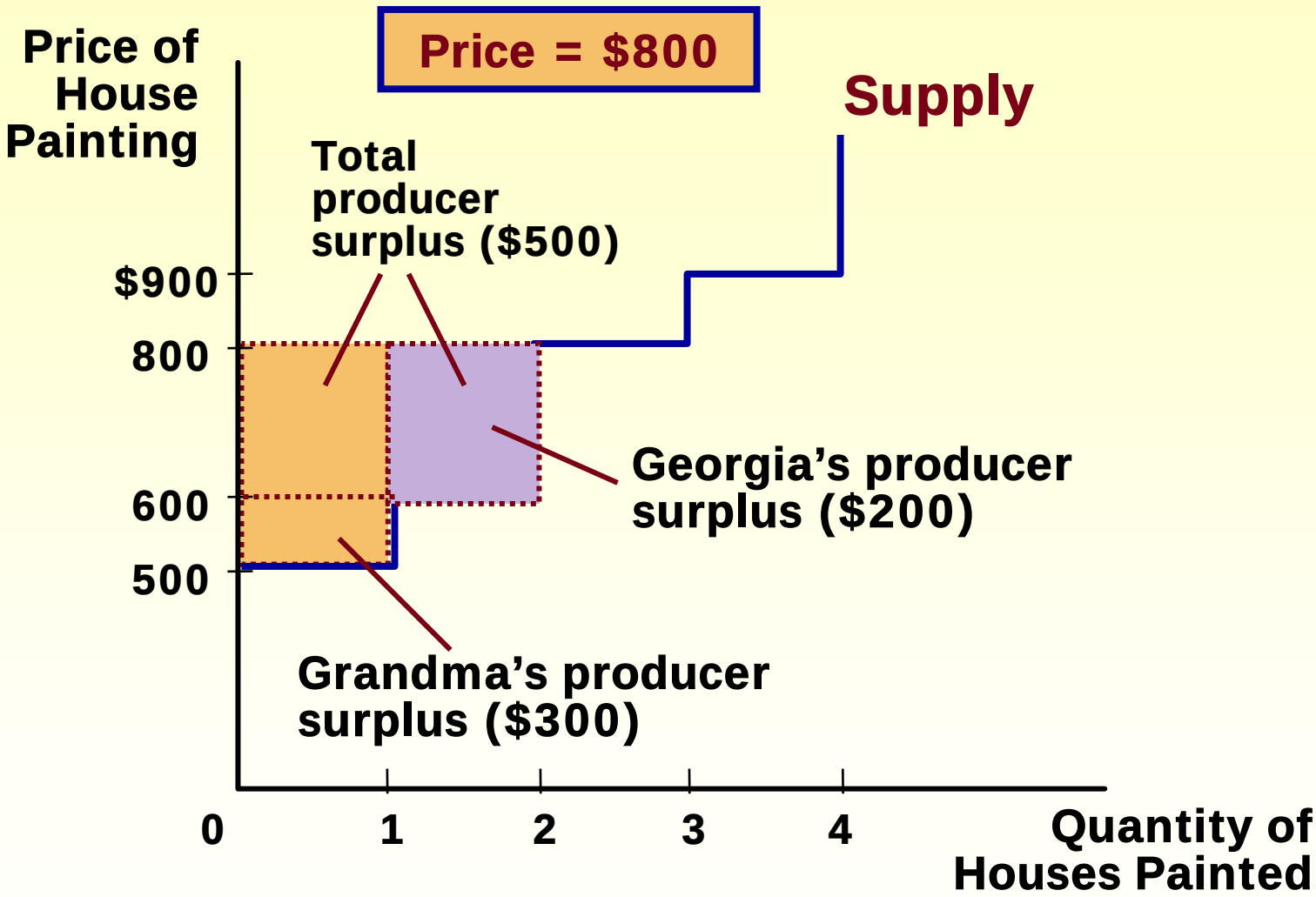
Measuring Producer Surplus with the Supply Curve...



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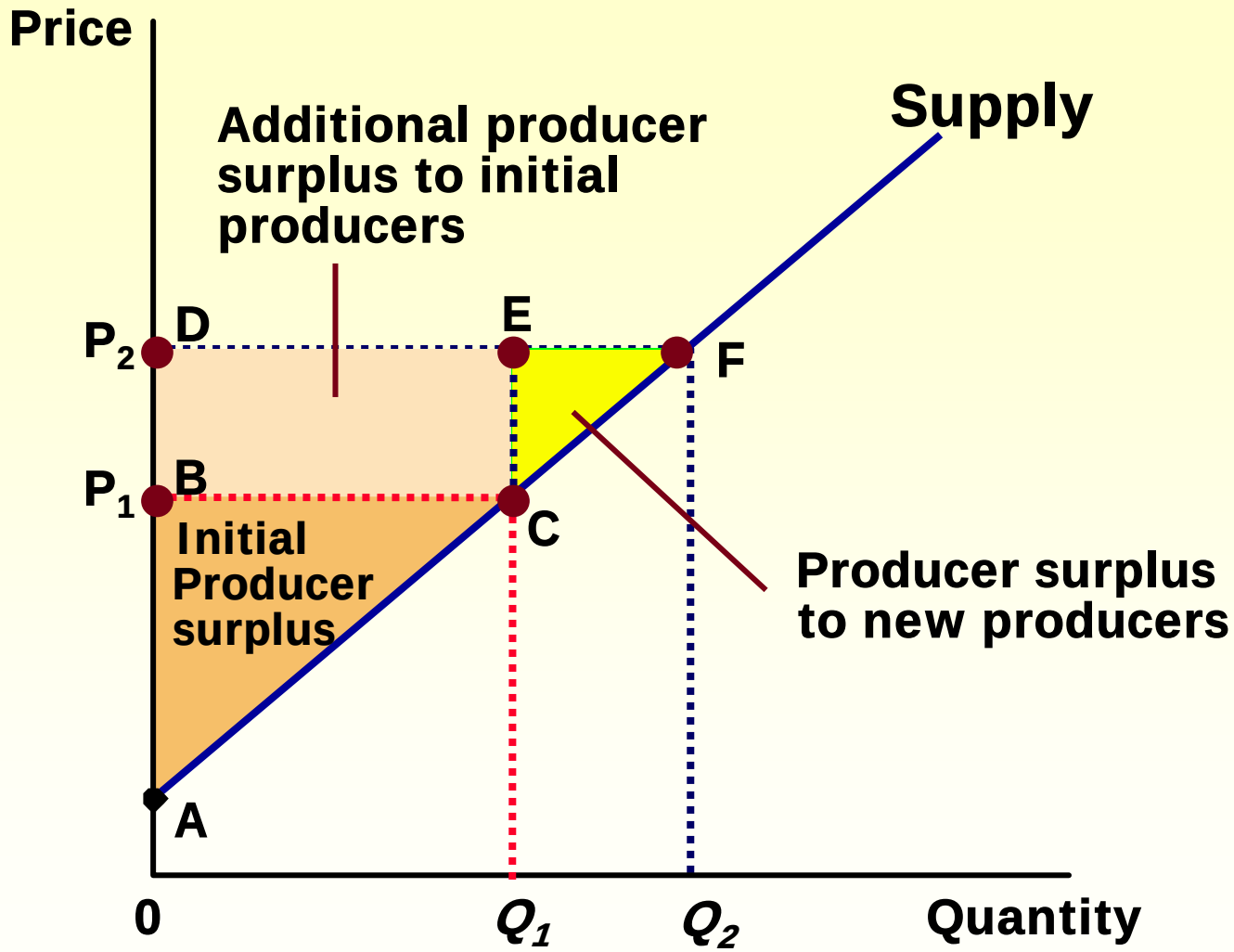
How Price Affects Producer Surplus...



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Market Efficiency

Consumer surplus and producer surplus may be used to address the following question:

Is the allocation of resources determined by free markets in any way desirable?

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Economic Well-Being and Total Surplus

Consumer Surplus = Value to buyers − Amount paid by buyers

and

Producer Surplus = Amount received by sellers − Cost to sellers

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Economic Well-Being and Total Surplus

Total Surplus = Consumer Surplus + Producer Surplus

or

Total Surplus = Value to buyers − Cost to sellers

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Market Efficiency

Market efficiency is achieved when the allocation of resources maximizes total surplus.

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Market Efficiency

In addition to market efficiency, a social planner might also care about equity – the fairness of the distribution of well-being among the various buyers and sellers.

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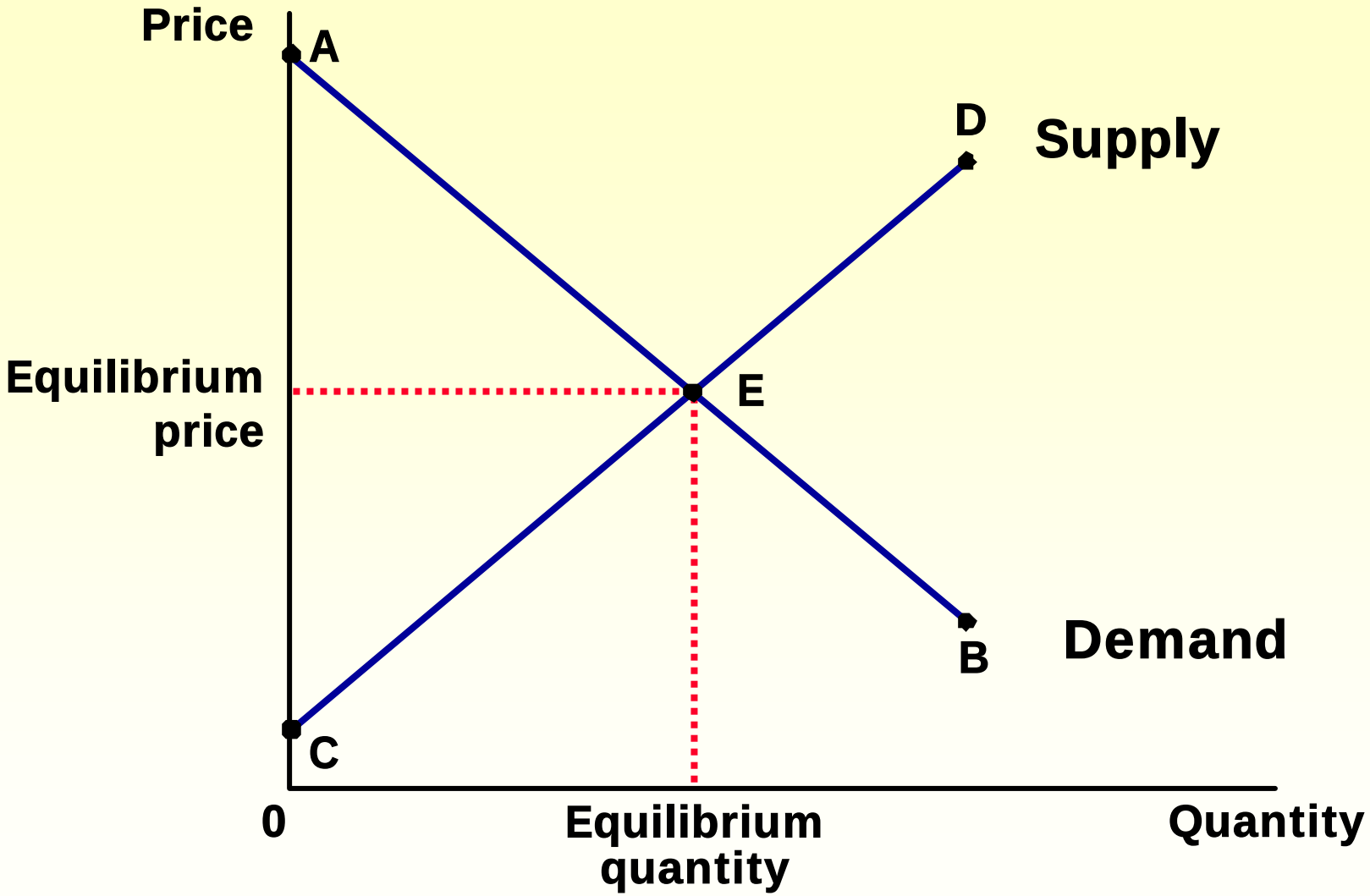
Evaluating the Market Equilibrium...



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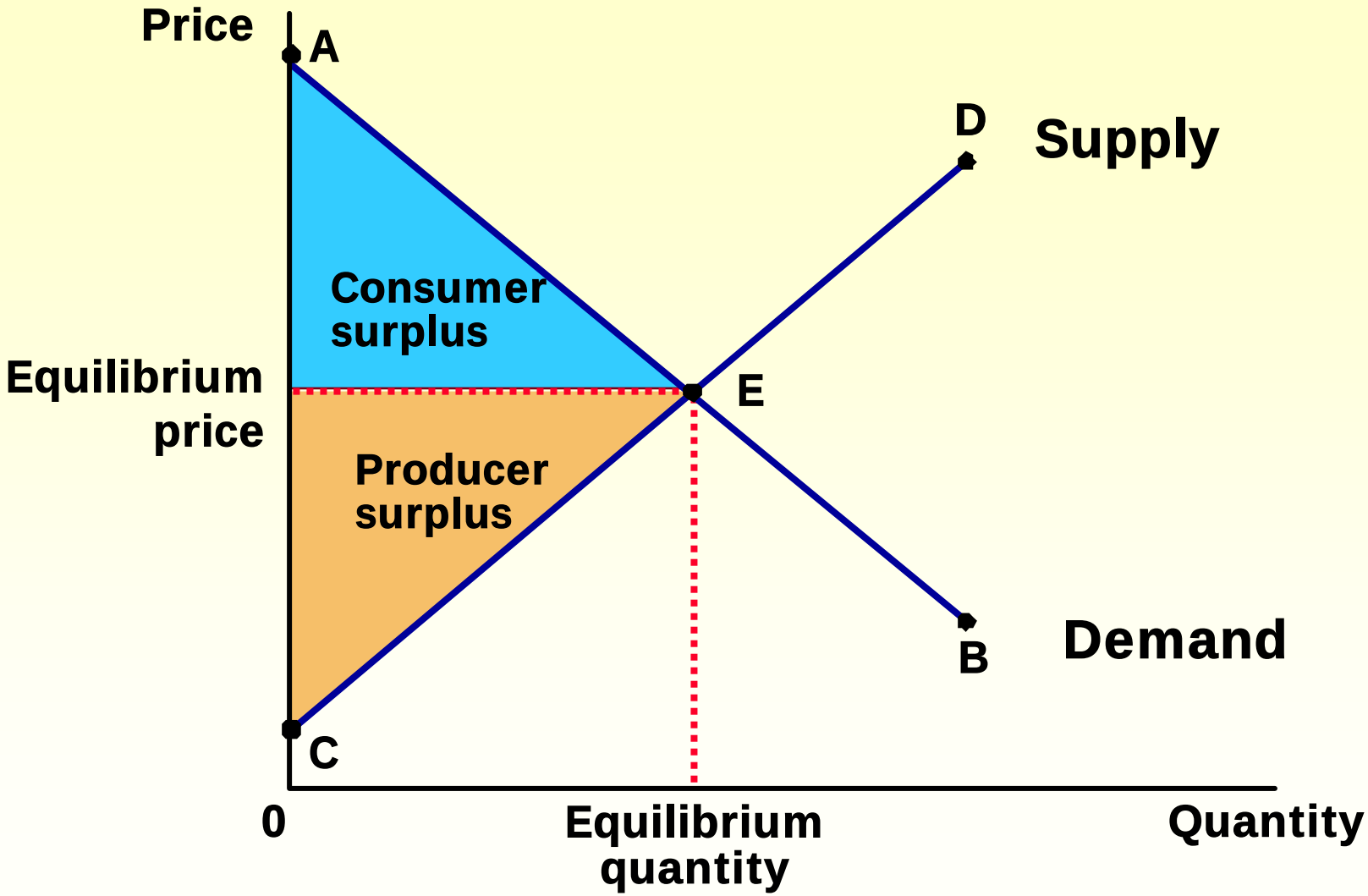
Consumer and Producer Surplus in the Market Equilibrium...



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Three Insights Concerning Market Outcomes

- Free markets allocate the supply of goods to the buyers who value them most highly.
- Free markets allocate the demand for goods to the sellers who can produce them at least cost.
- Free markets produce the quantity of goods that maximizes the sum of consumer and producer surplus.

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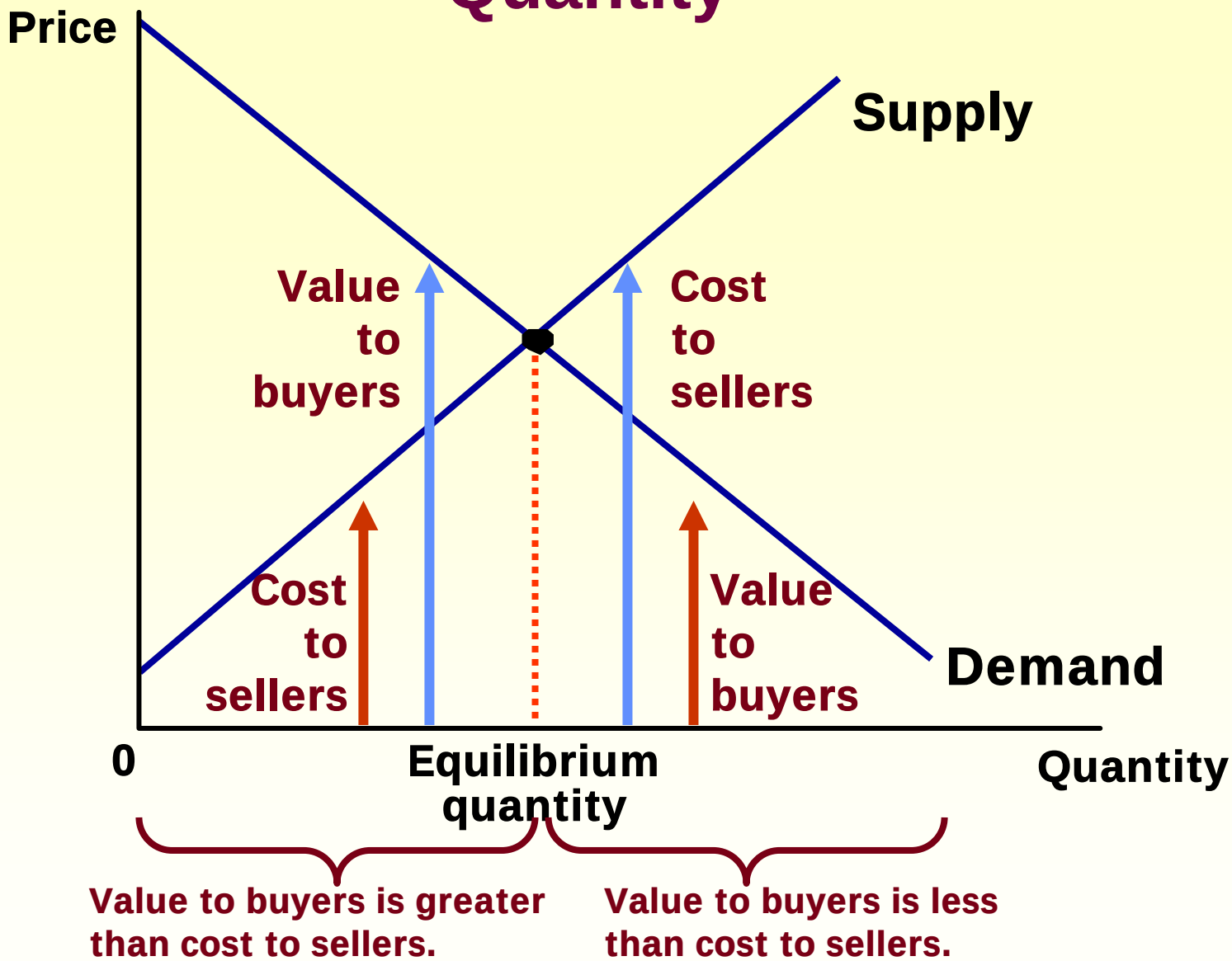
The Efficiency of the Equilibrium Quantity



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The Efficiency of the Equilibrium Quantity

- Because the equilibrium outcome is an efficient allocation of resources, the social planner can leave the market outcome as he/she finds it.
- This policy of leaving well enough alone goes by the French expression ***laissez faire***.

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Market Power

- If a market system is not perfectly competitive, **market power** may result.
- Market power is the ability to influence prices.
- Market power can cause markets to be inefficient because it keeps price and quantity from the equilibrium of supply and demand.

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Externalities

Externalities are created when a market outcome affects individuals other than buyers and sellers in that market.

- Externalities cause welfare in a market to depend on more than just the value to the buyers and cost to the sellers.
- When buyers and sellers do not take externalities into account when deciding how much to consume and produce, the equilibrium in the market can be inefficient.

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Summary

- Consumer surplus measures the benefit buyers get from participating in a market.
- Consumer surplus can be computed by finding the area below the demand curve and above the price.

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Summary

- Producer surplus measures the benefit sellers get from participating in a market.
- Producer surplus can be computed by finding the area below the price and above the supply curve.

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Summary

- The equilibrium of demand and supply maximizes the sum of consumer and producer surplus.
- This is as if the invisible hand of the marketplace leads buyers and sellers to allocate resources efficiently.
- Markets do not allocate resources efficiently in the presence of market failures.

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Summary

- An allocation of resources that maximizes the sum of consumer and producer surplus is said to be efficient.
- Policymakers are often concerned with the efficiency, as well as the equity, of economic outcomes.

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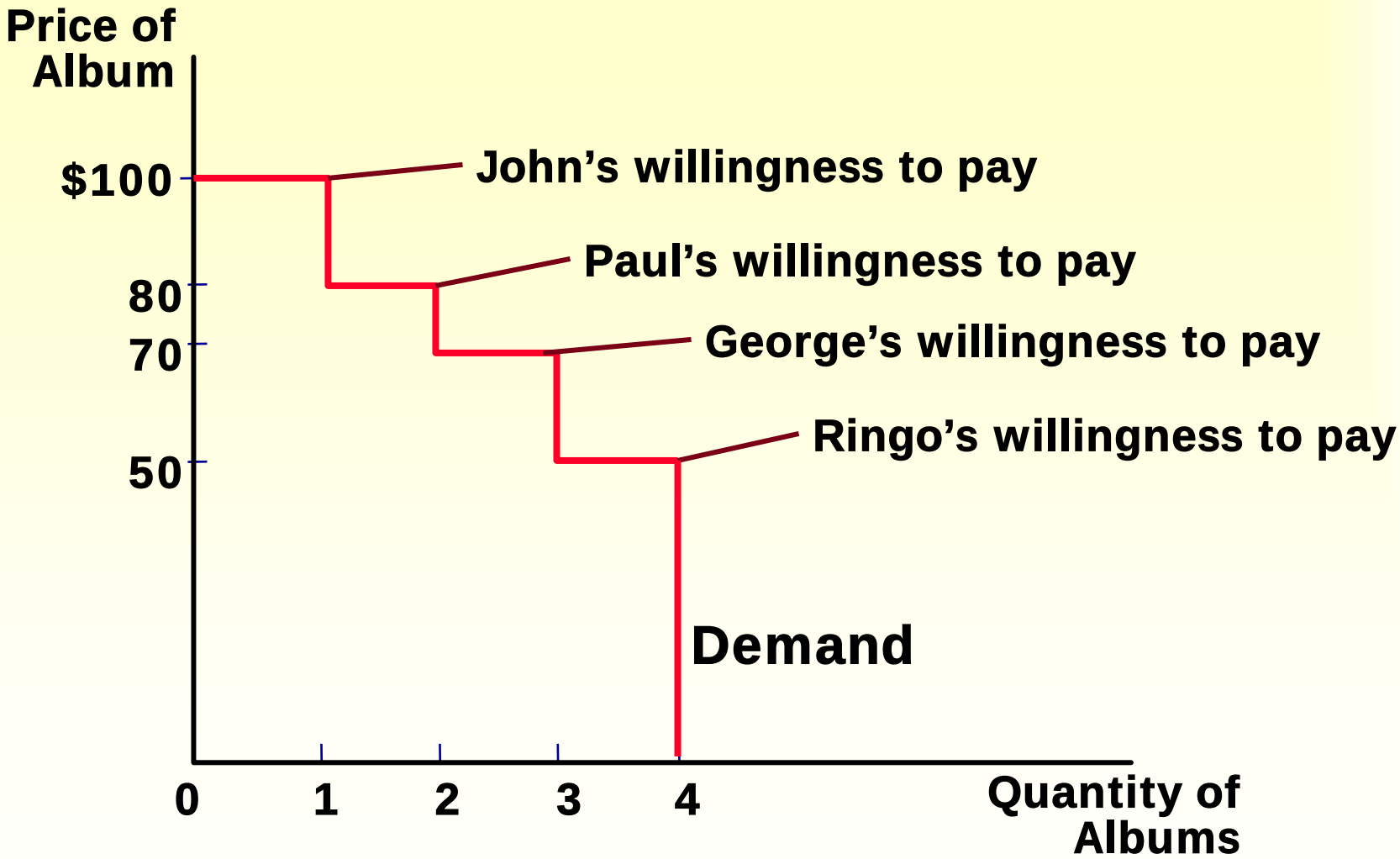

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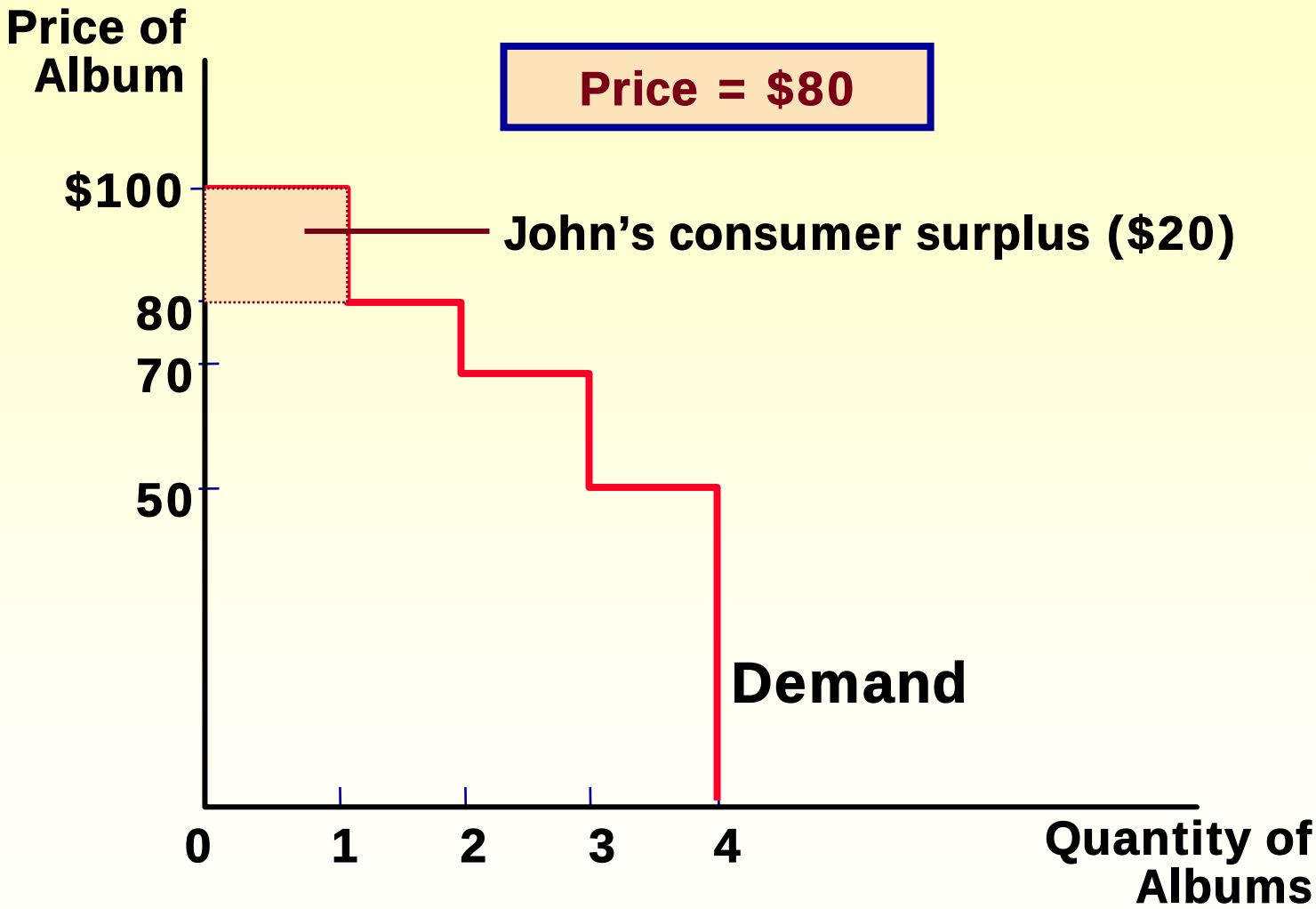
Measuring Consumer Surplus with the Demand Curve...



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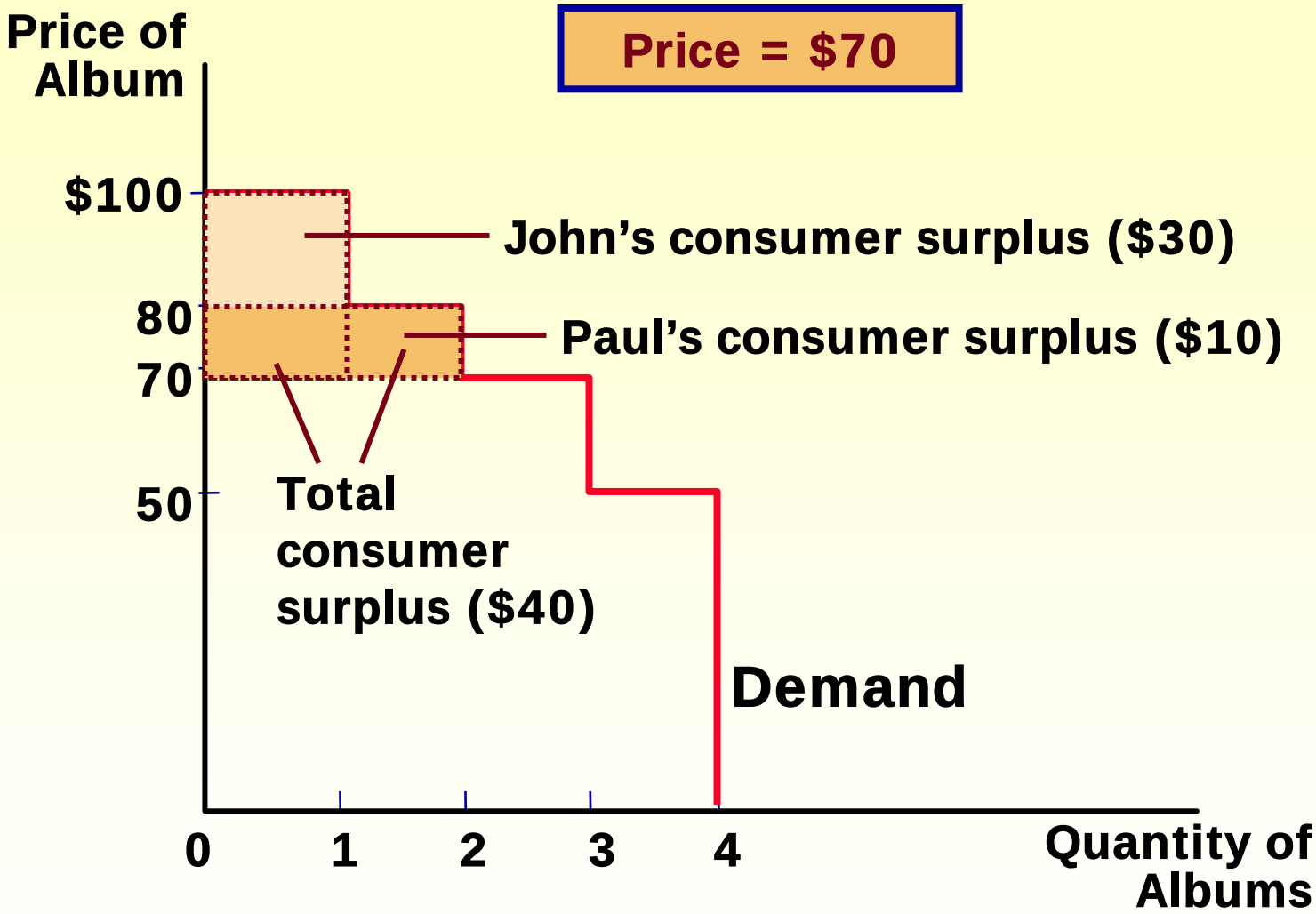
Measuring Consumer Surplus with the Demand Curve...



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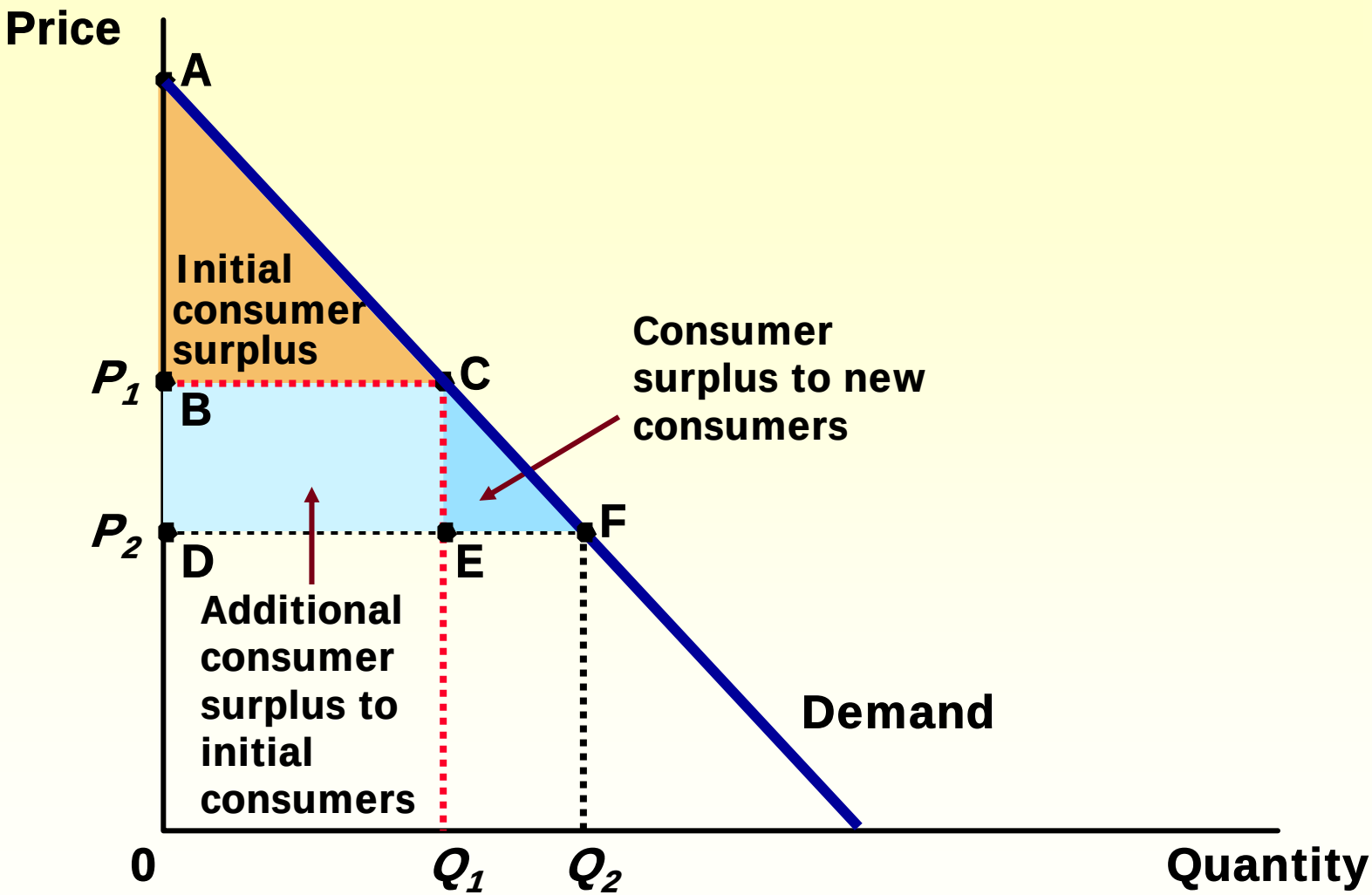
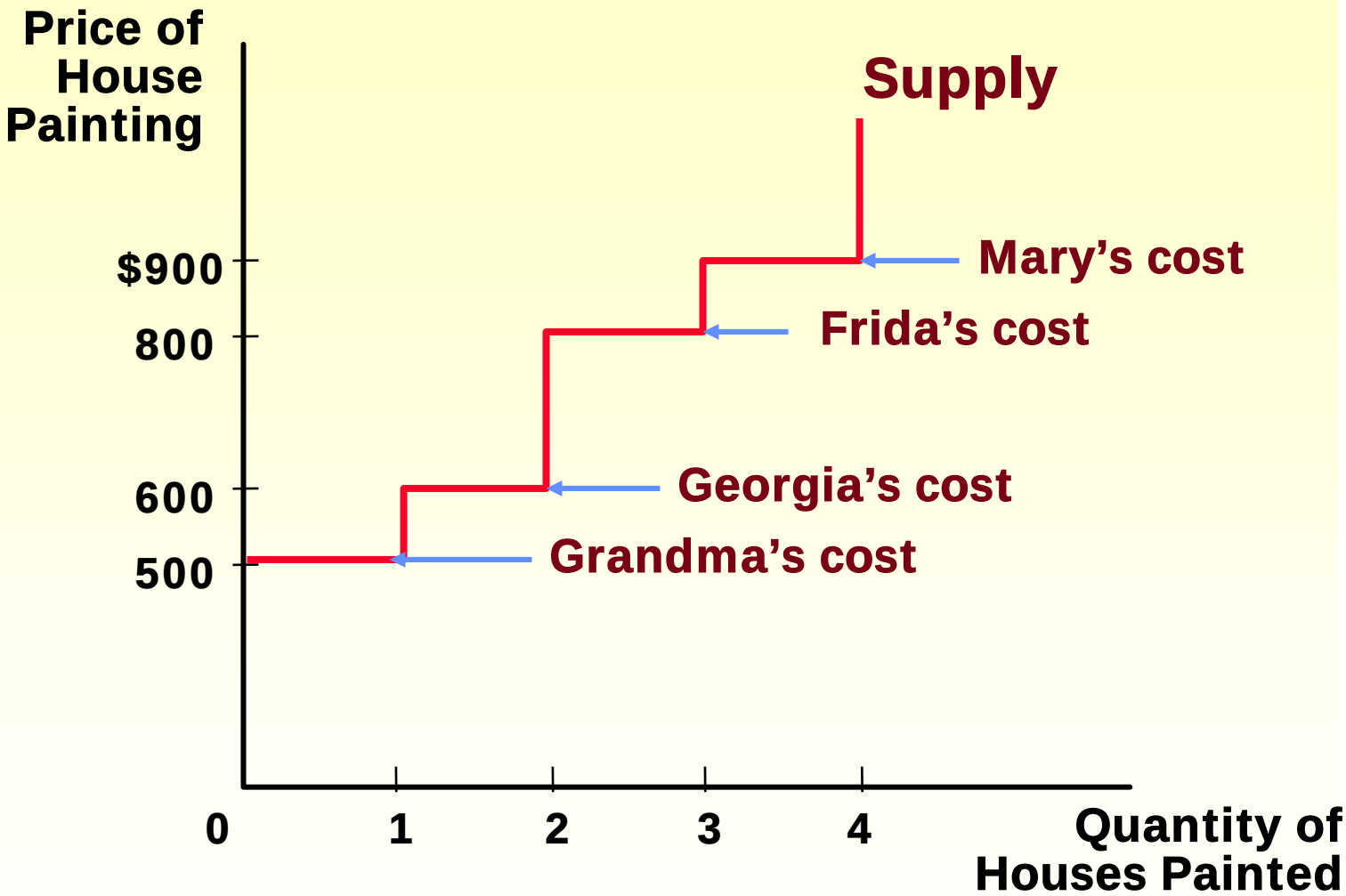
How the Price Affects Consumer Surplus...



Producer Surplus and the Supply Curve...



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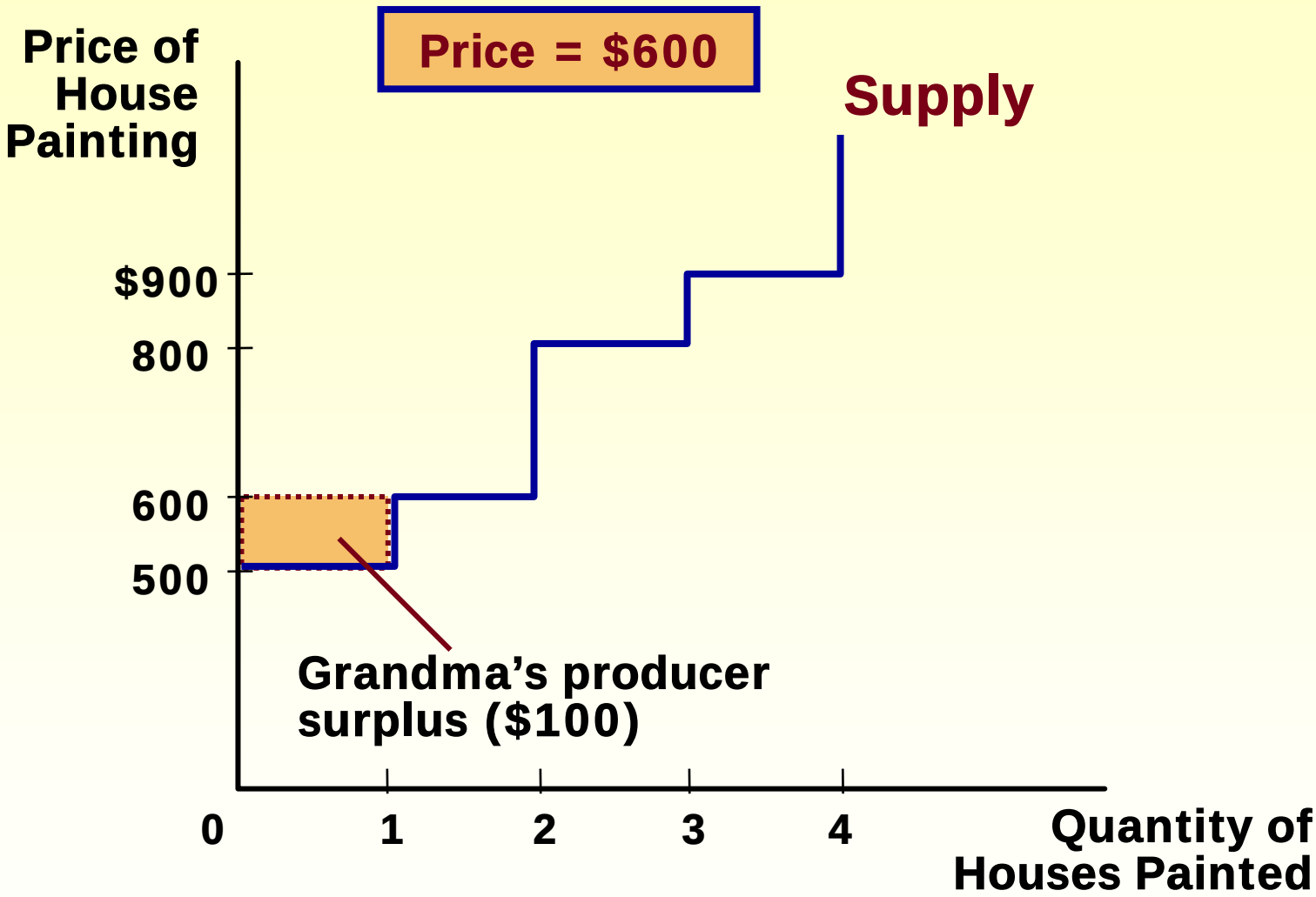
Measuring Producer Surplus with the Supply Curve...



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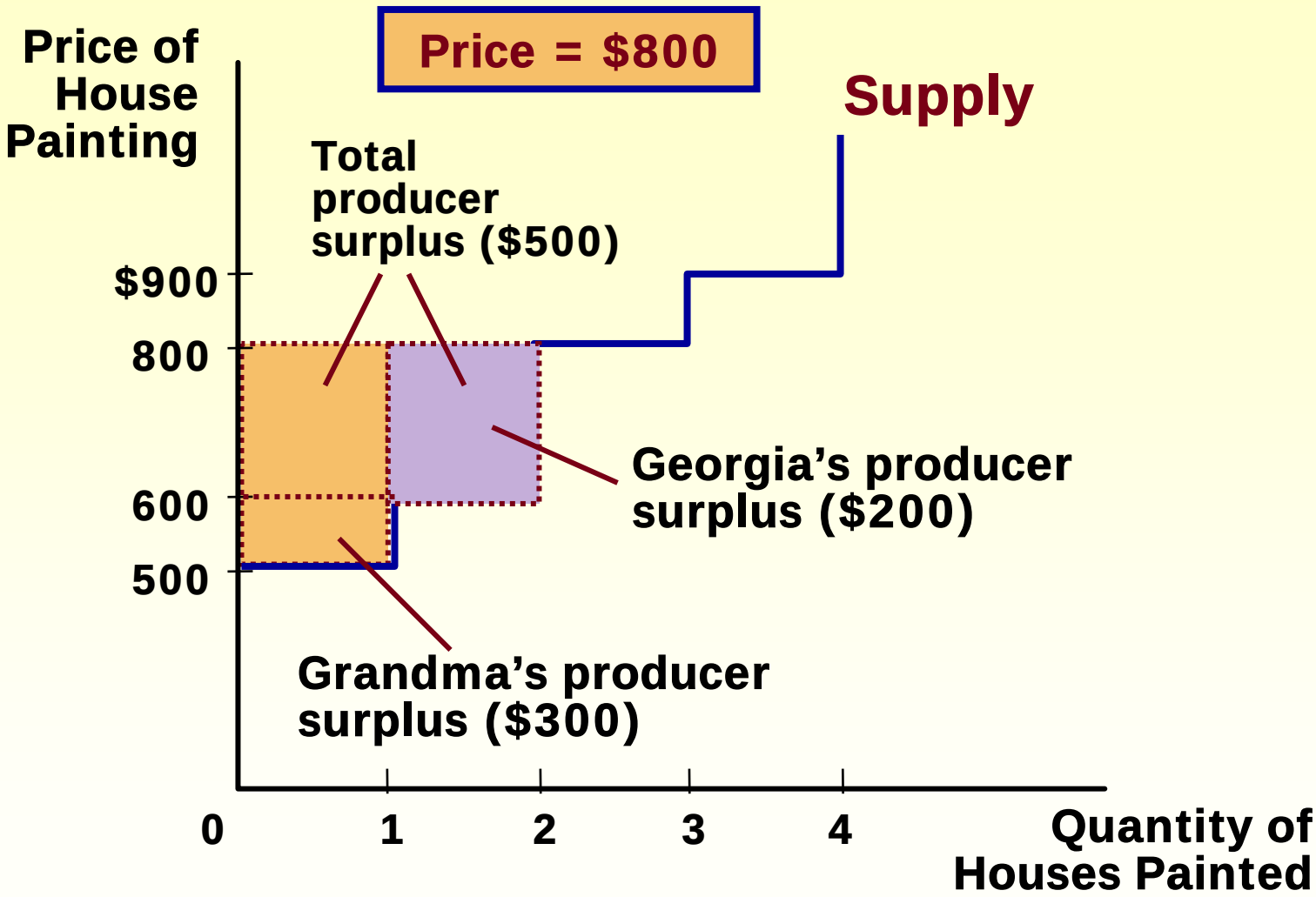
Measuring Producer Surplus with the Supply Curve...



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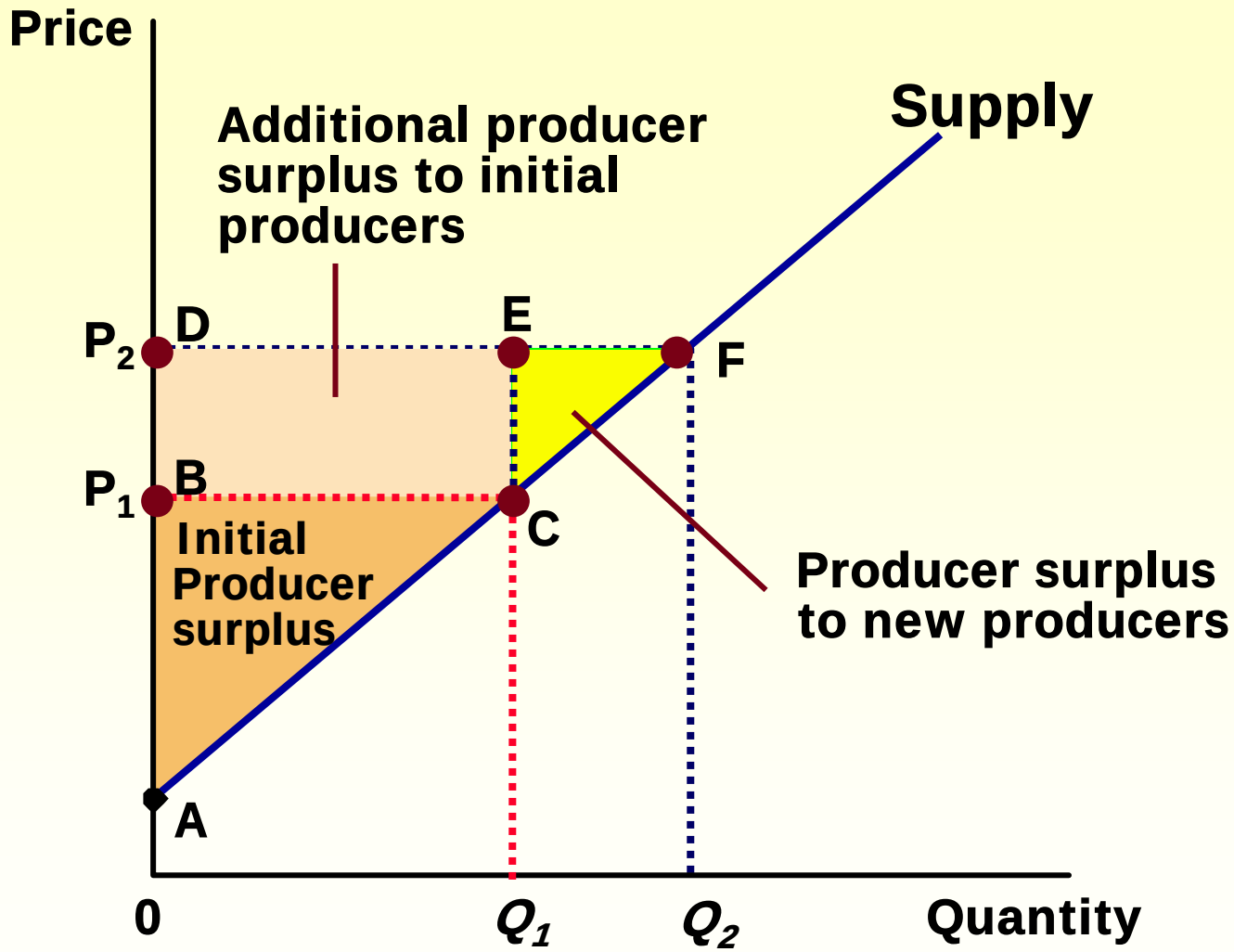
How Price Affects Producer Surplus...



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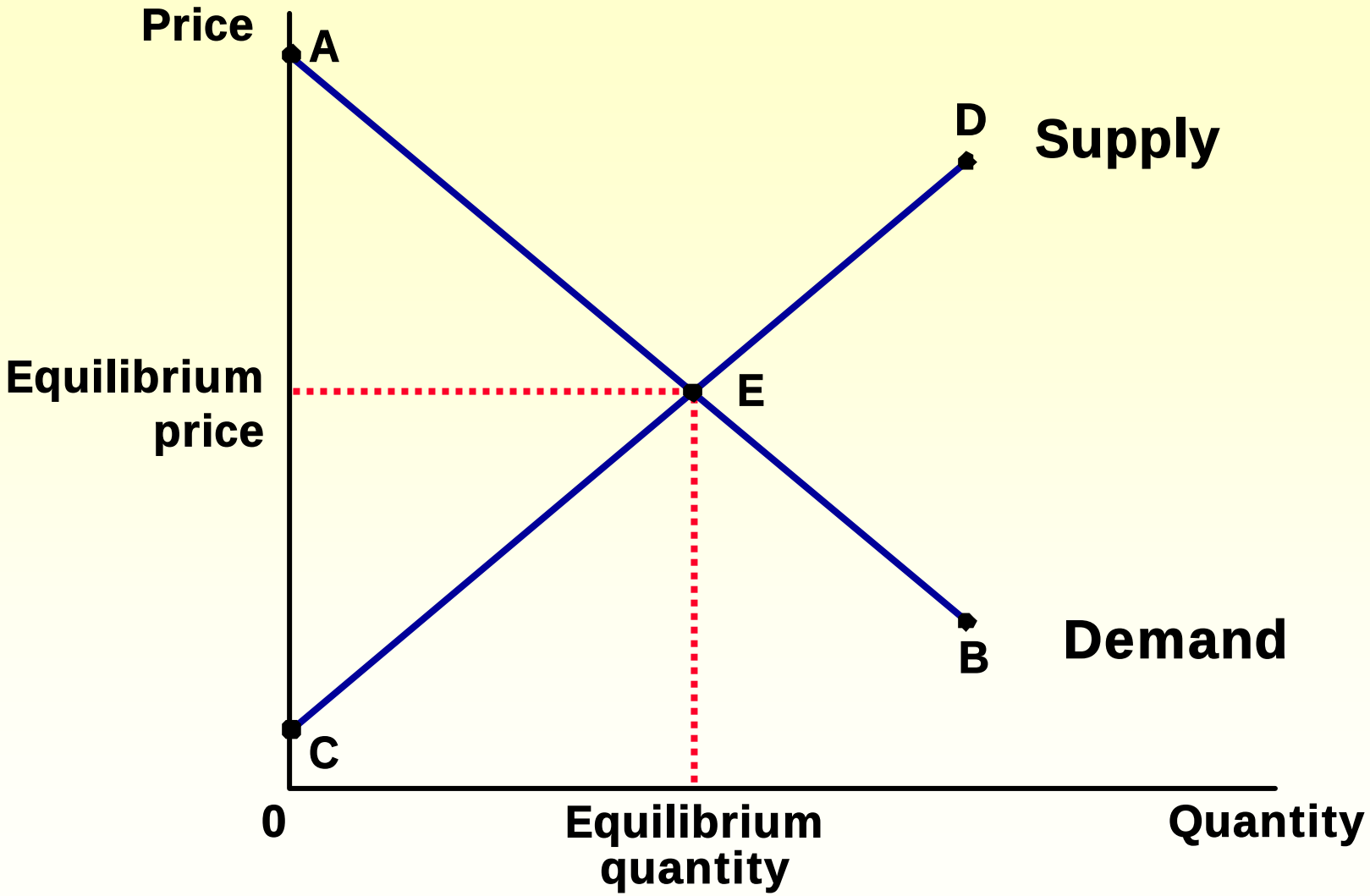
Evaluating the Market Equilibrium...



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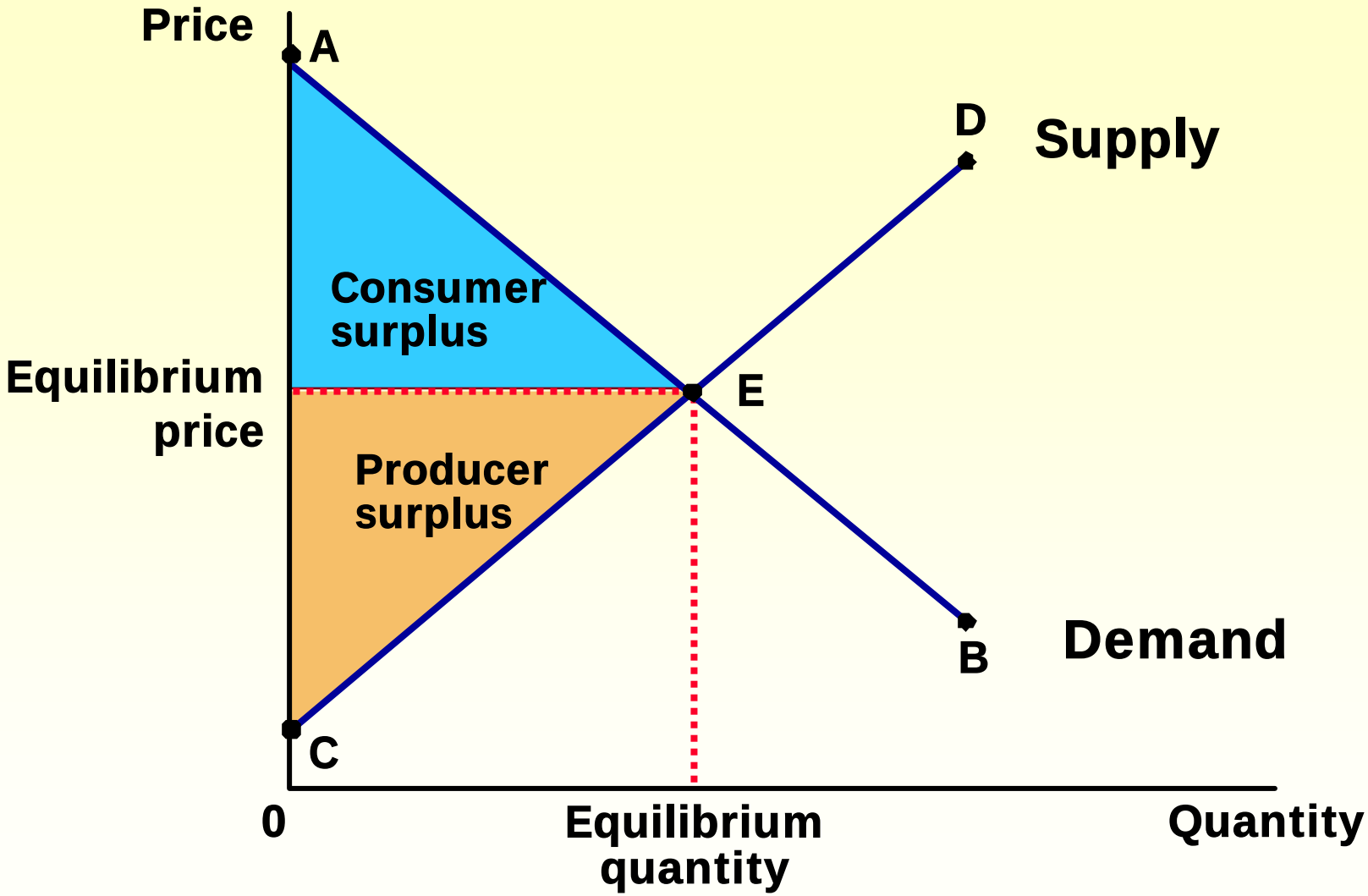
Consumer and Producer Surplus in the Market Equilibrium...



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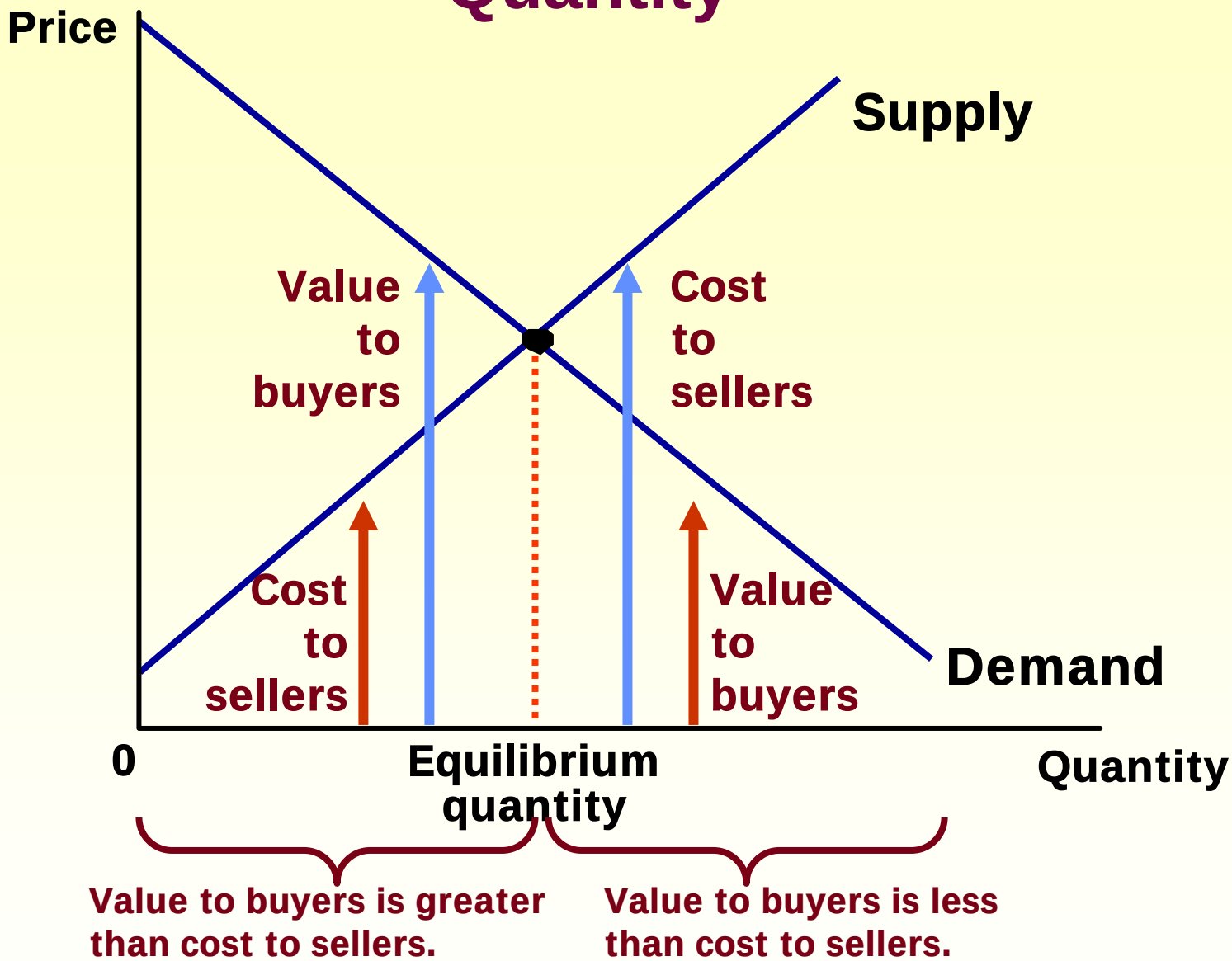
The Efficiency of the Equilibrium Quantity



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Application: The Costs of Taxation

Chapter 8

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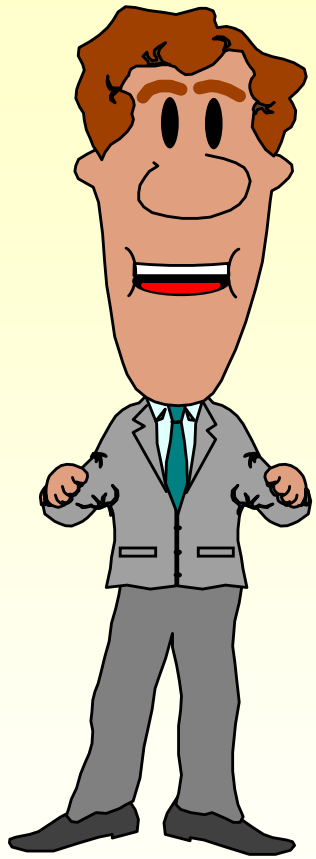
The Costs of Taxation

How do taxes affect the economic well-being of market participants?



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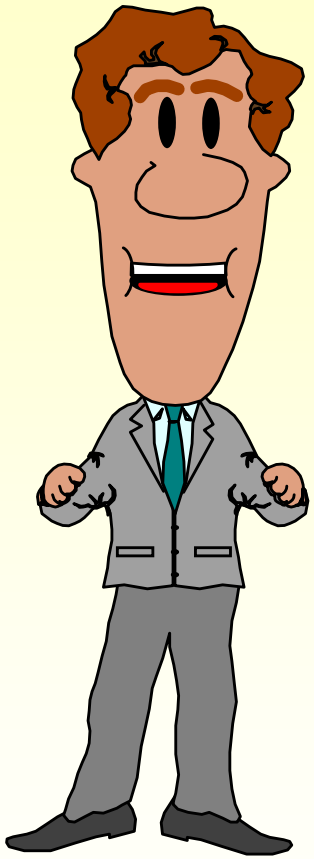
The Costs of Taxation



It does not matter whether a tax on a good is levied on buyers or sellers of the good…the price paid by buyers rises, and the price received by sellers falls.

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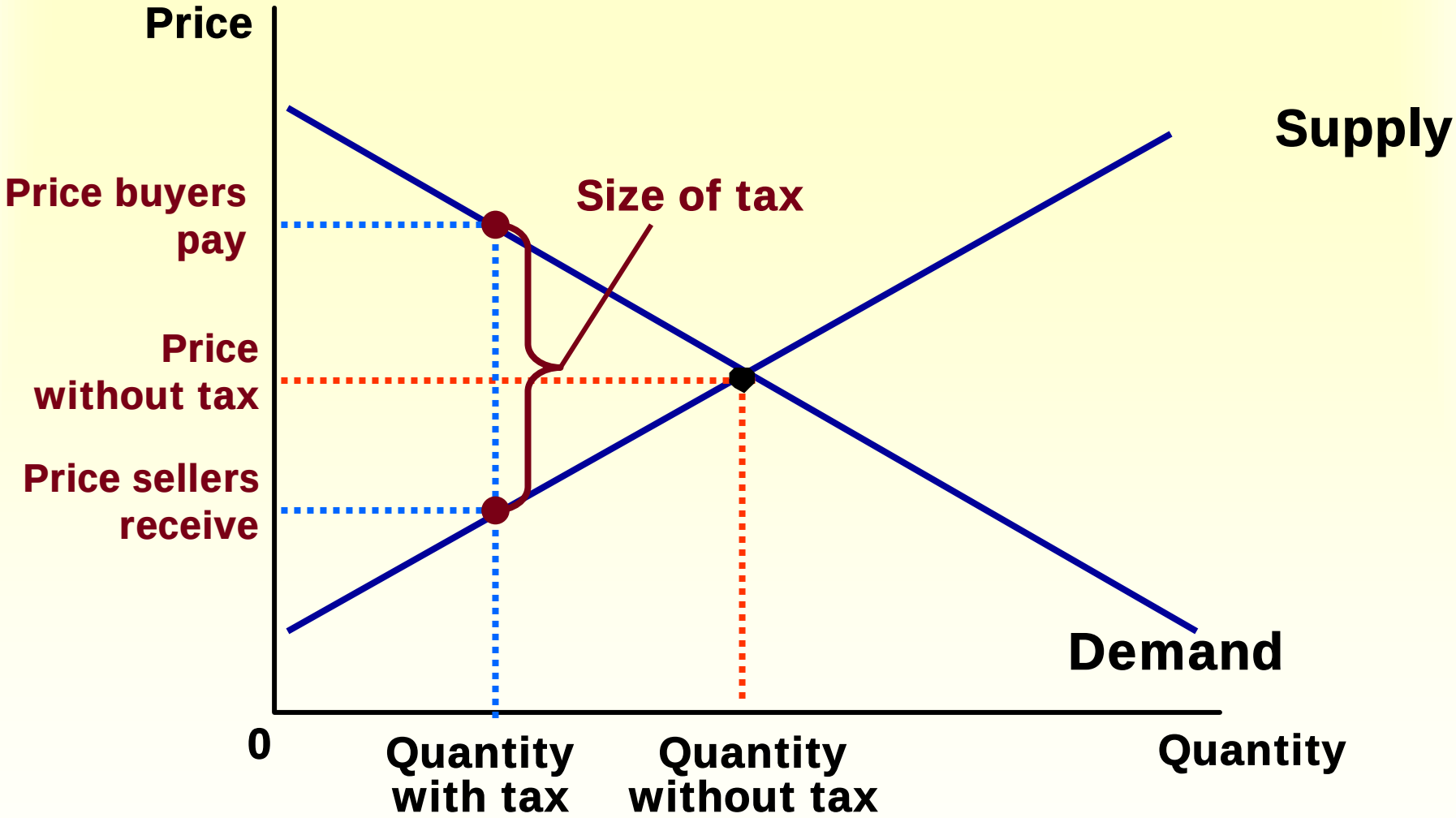
The Effects of a Tax...



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The Effects of a Tax

- A tax places a wedge between the price buyers pay and the price sellers receive.
- Because of this tax wedge, the quantity sold falls below the level that would be sold without a tax.
- The size of the market for that good shrinks.

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Tax Revenue

T = the size of the tax

Q = the quantity of the good sold

$T \times Q$ = the government's tax revenue

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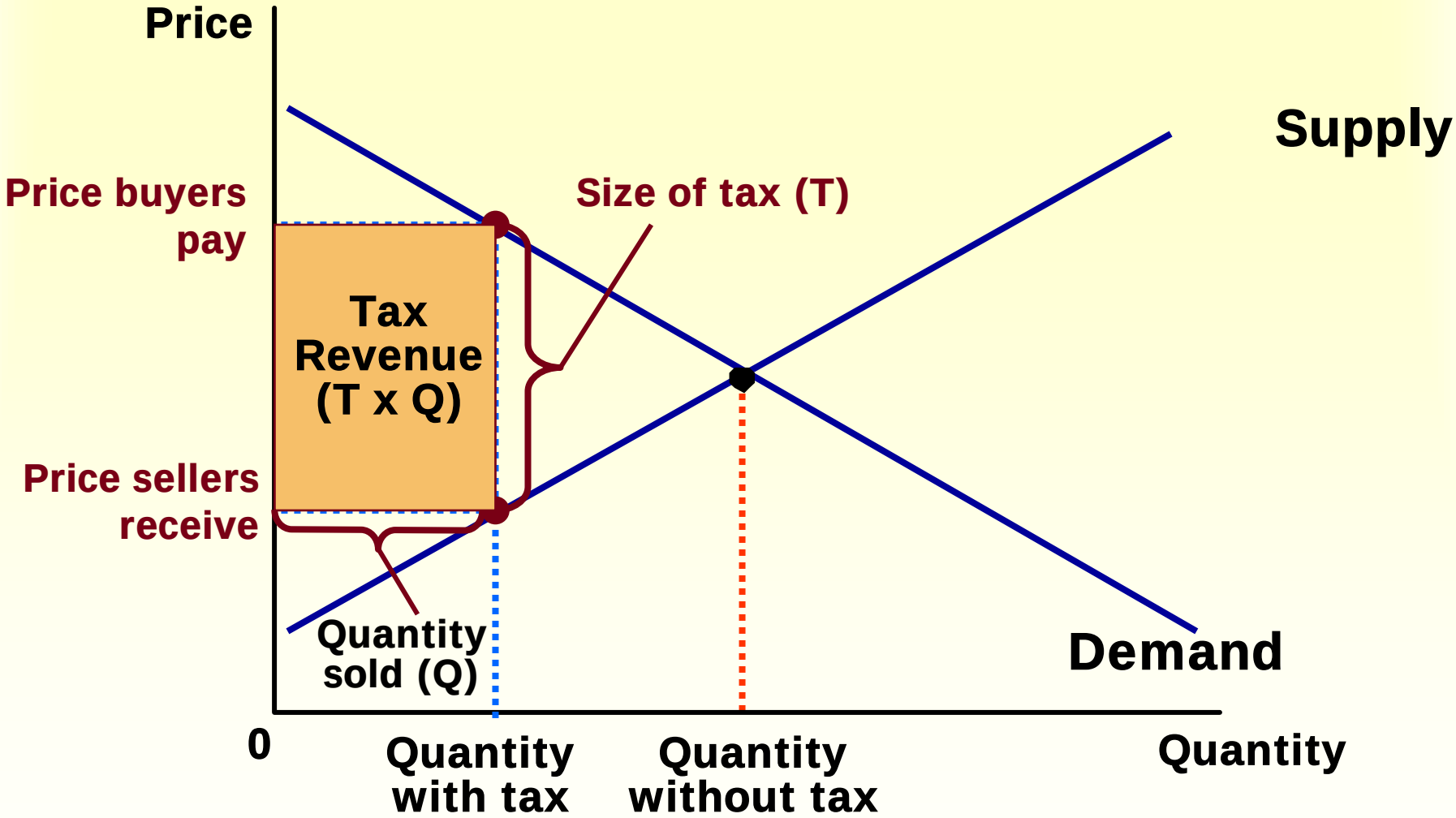
Tax Revenue...



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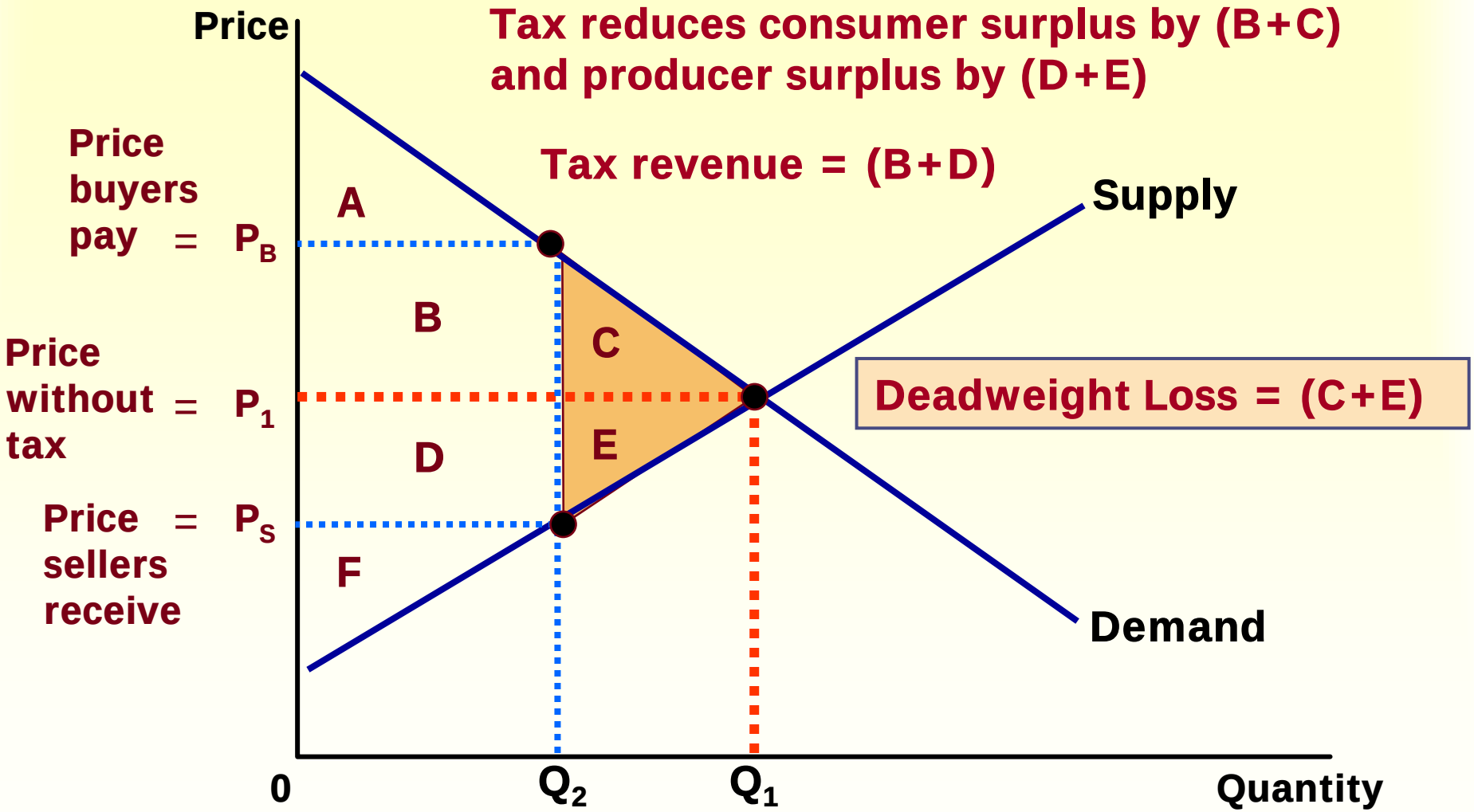
How a Tax Affects Welfare...



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Changes in Welfare from a Tax

	Without Tax	With Tax	Change
Consumer Surplus	A + B + C	A	- (B + C)
Producer Surplus	D + E + F	F	- (D + E)
Tax Revenue	none	B + D	+ (B + D)
Total Surplus	A + B + C + D + E + F	A + B + D + F	- (C + E)

The area C+E shows the fall in total surplus and is the ***deadweight loss*** of the tax.

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How a Tax Affects Welfare

The change in total welfare includes:

- The change in consumer surplus,
- The change in producer surplus,
- The change in tax revenue.
- The losses to buyers and sellers exceed the revenue raised by the government.
- This fall in total surplus is called the **deadweight loss**.

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Deadweight Losses and the Gains from Trade

Taxes cause deadweight losses because they prevent buyers and sellers from realizing some of the gains from trade.

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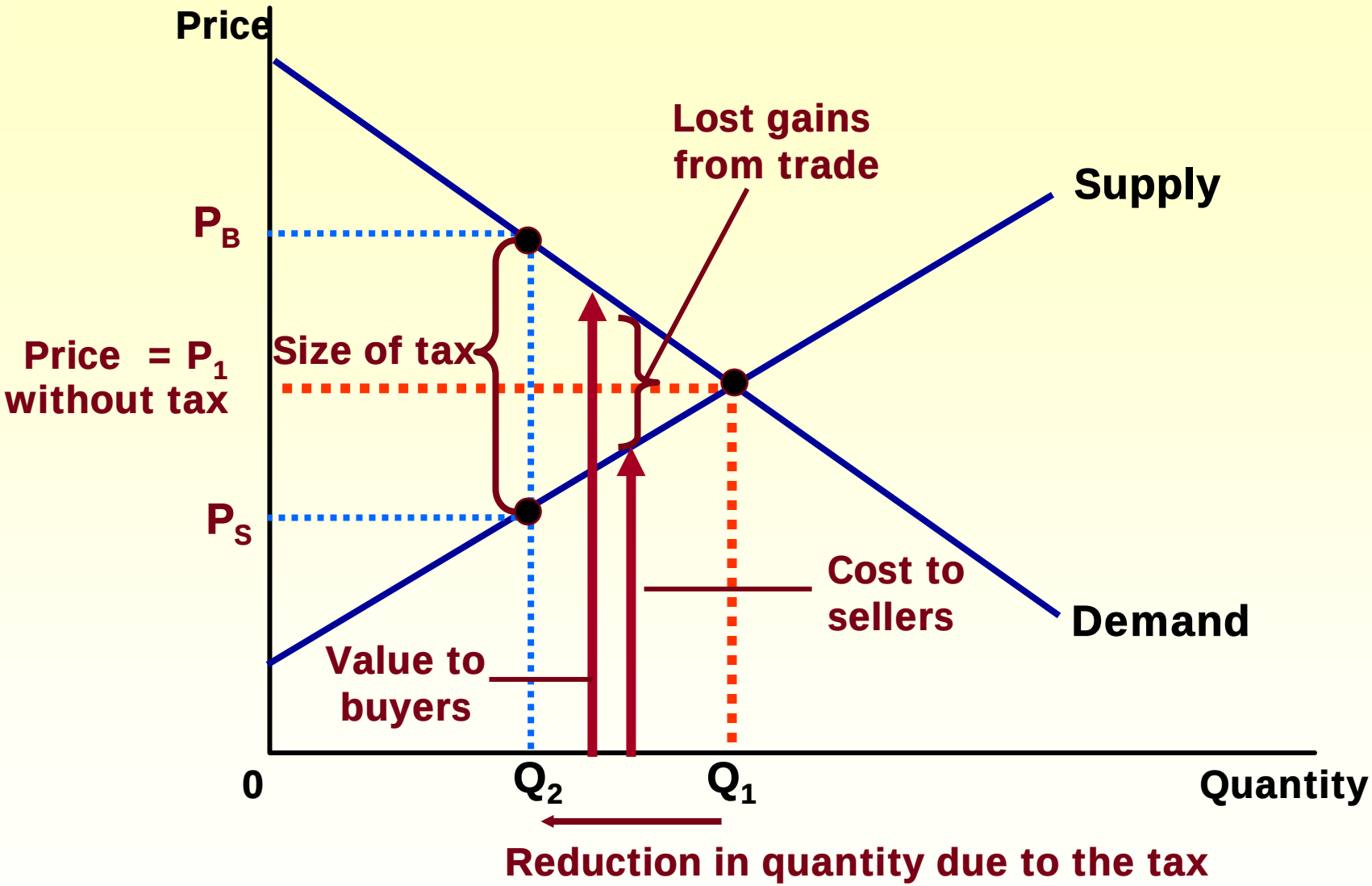
The Deadweight Loss...



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Determinants of Deadweight Loss

What determines whether the deadweight loss from a tax is large or small?

- The magnitude of the deadweight loss depends on how much the quantity supplied and quantity demanded respond to changes in the price.
- That, in turn, depends on the **price elasticities** of supply and demand.

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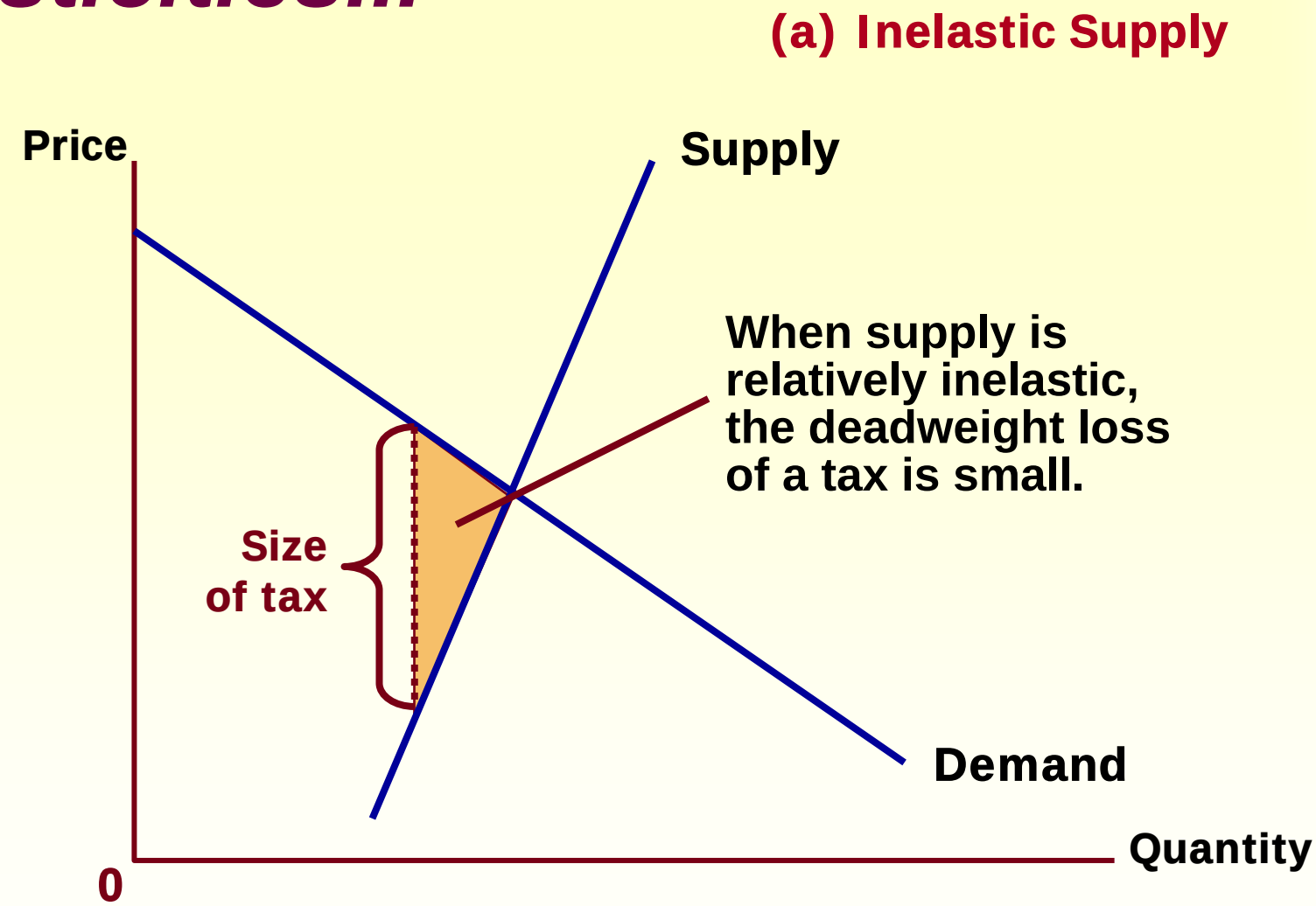
Tax Distortions and Elasticities...



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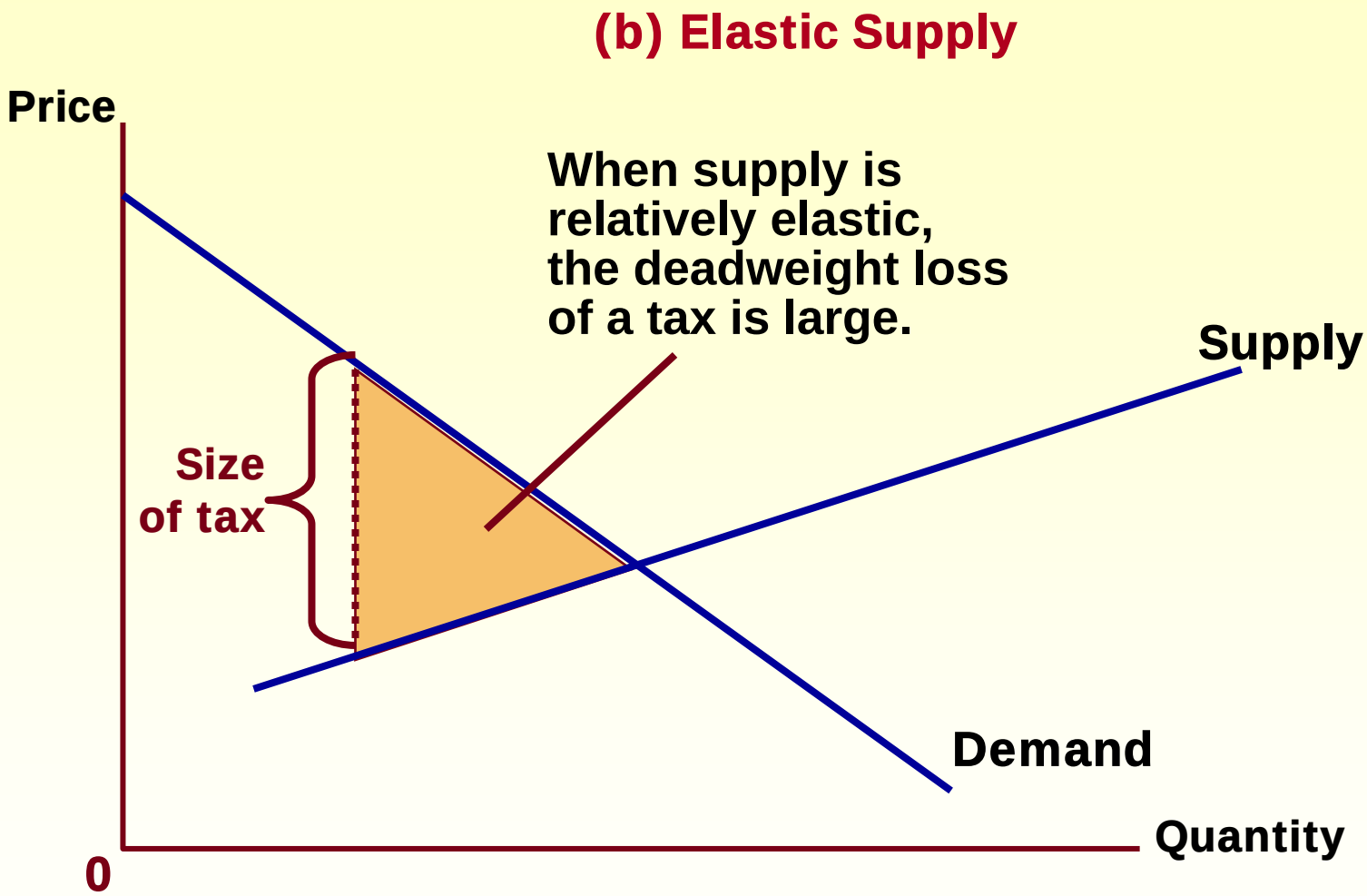
Tax Distortions and Elasticities...



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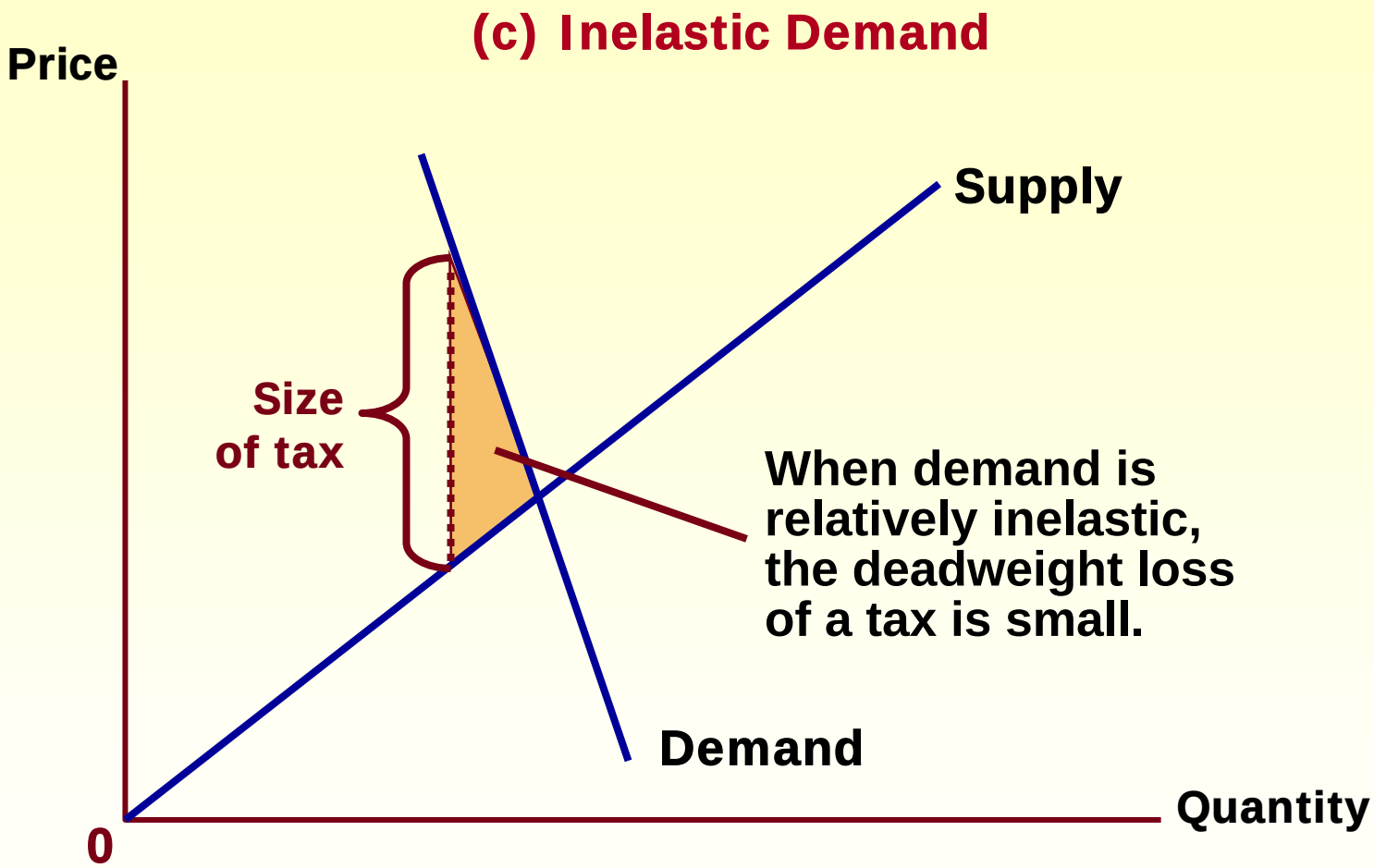
Tax Distortions and Elasticities...



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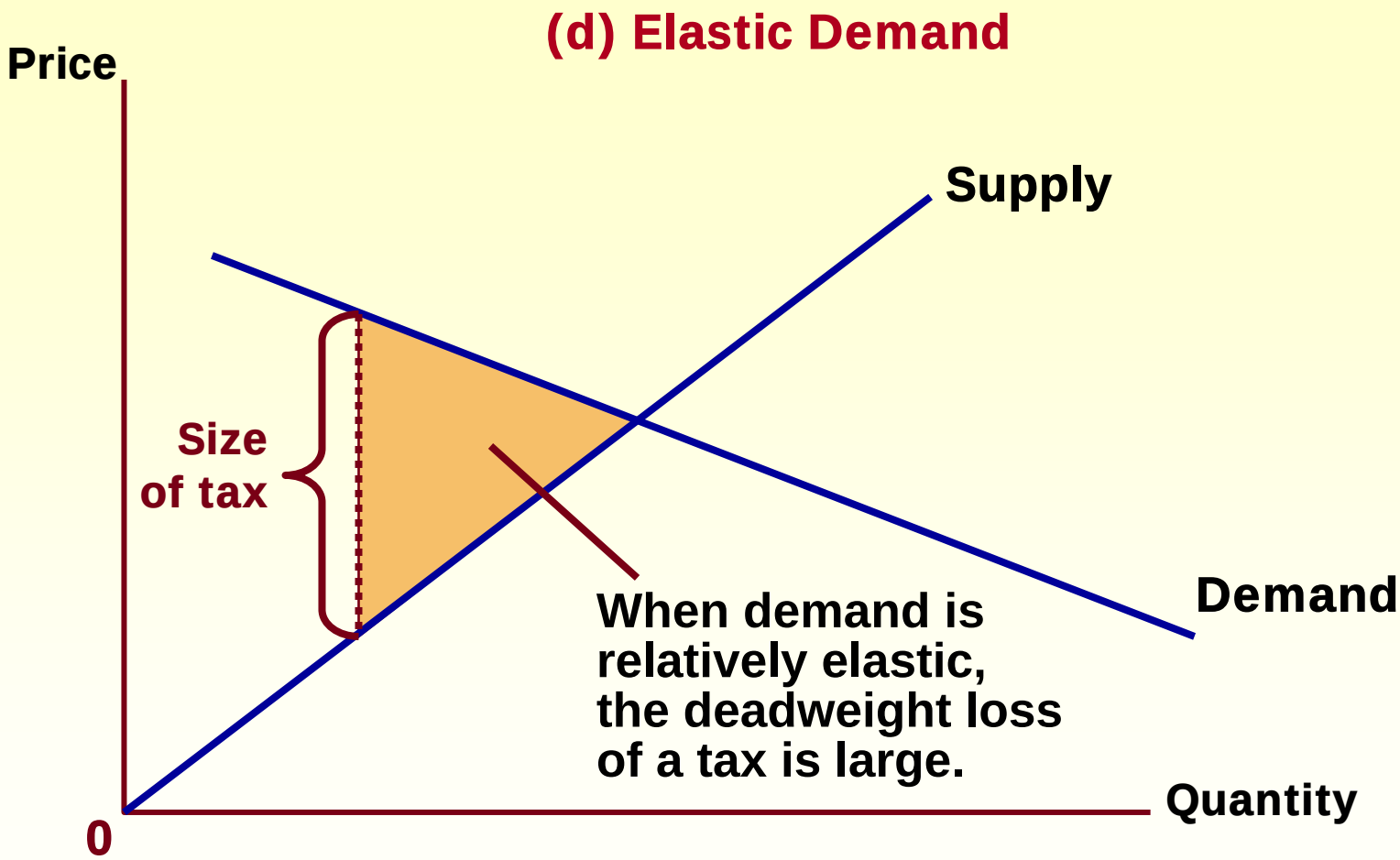
Tax Distortions and Elasticities...



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Determinants of Deadweight Loss

The greater the elasticities of demand and supply:

- **the larger will be the decline in equilibrium quantity and,**
- **the greater the deadweight loss of a tax.**

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The Deadweight Loss Debate

Some economists argue that labor taxes are highly distorting and believe that labor supply is more elastic.

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The Deadweight Loss Debate

Some examples of workers who may respond more to incentives:

- Workers who can adjust the number of hours they work
- Families with second earners
- Elderly who can choose when to retire
- Workers in the underground economy (i.e. those engaging in illegal activity)

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Deadweight Loss and Tax Revenue as Taxes Vary

With each increase in the tax rate, the deadweight loss of the tax rises even more rapidly than the size of the tax.

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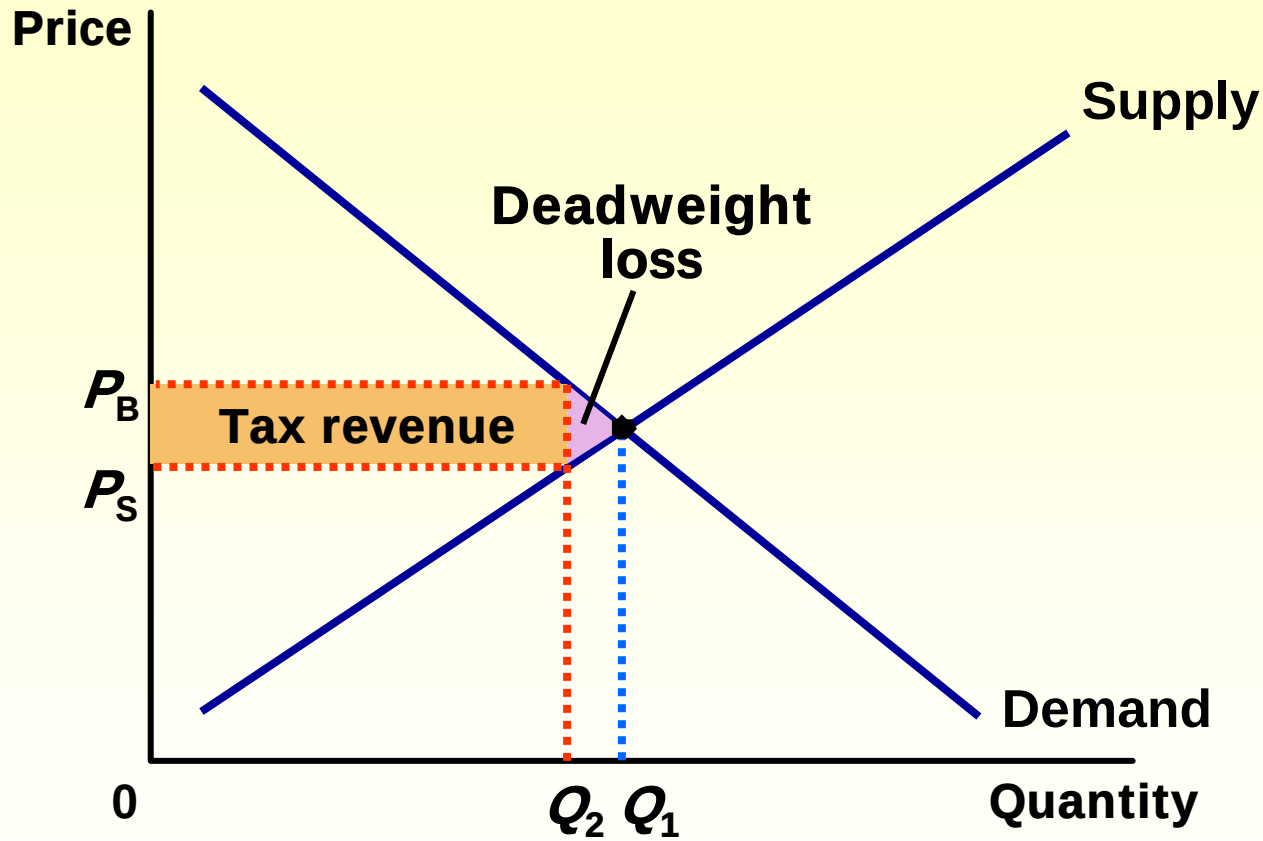
Deadweight Loss and Tax Revenue...

(a) Small Tax



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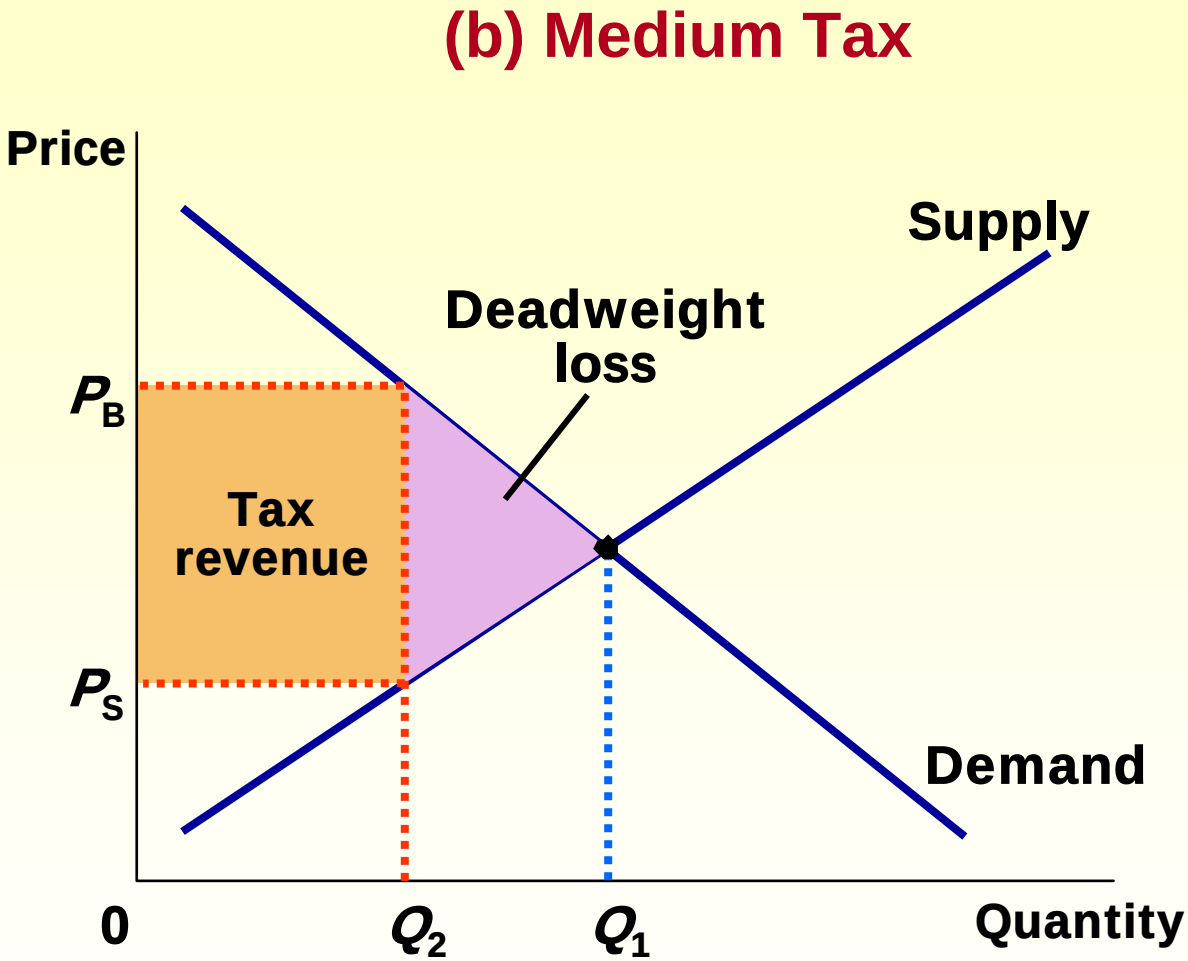
Deadweight Loss and Tax Revenue...



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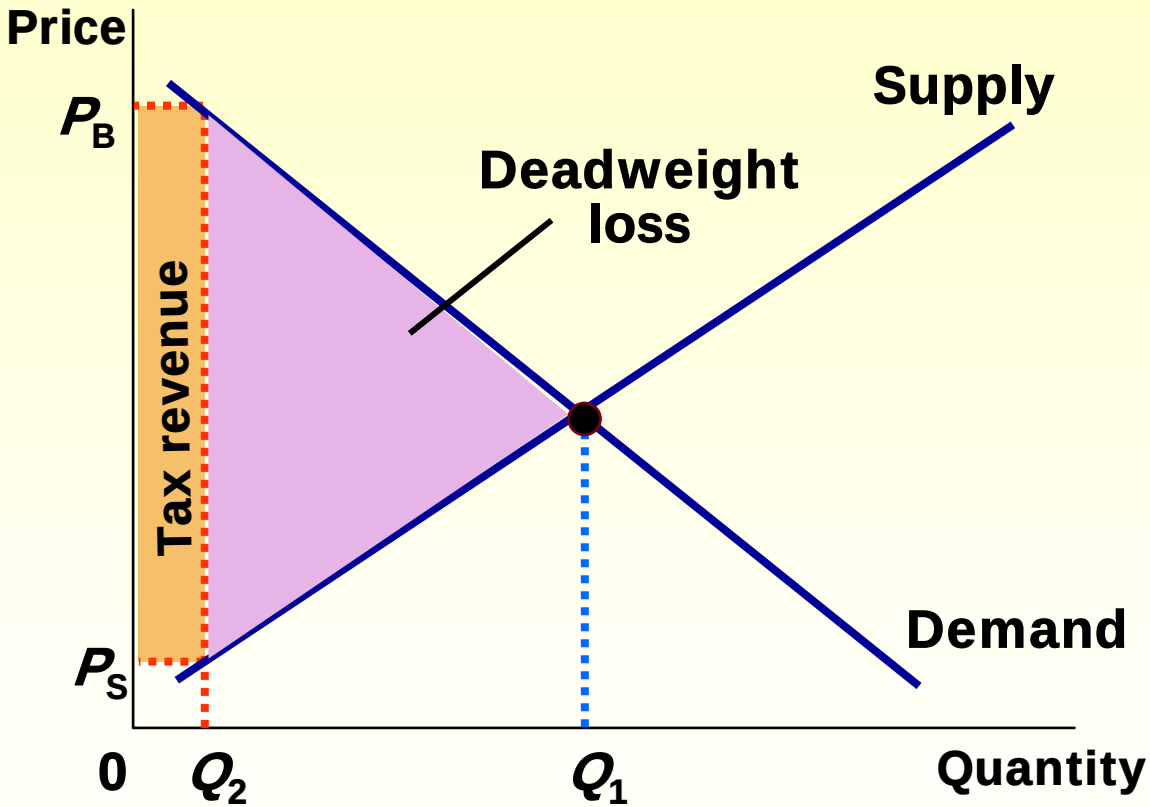
Deadweight Loss and Tax Revenue...

(c) Large Tax



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Deadweight Loss and Tax Revenue

- For the small tax, tax revenue is small.
- As the size of the tax rises, tax revenue grows.
- But as the size of the tax continues to rise, tax revenue falls because the higher tax reduces the size of the market.

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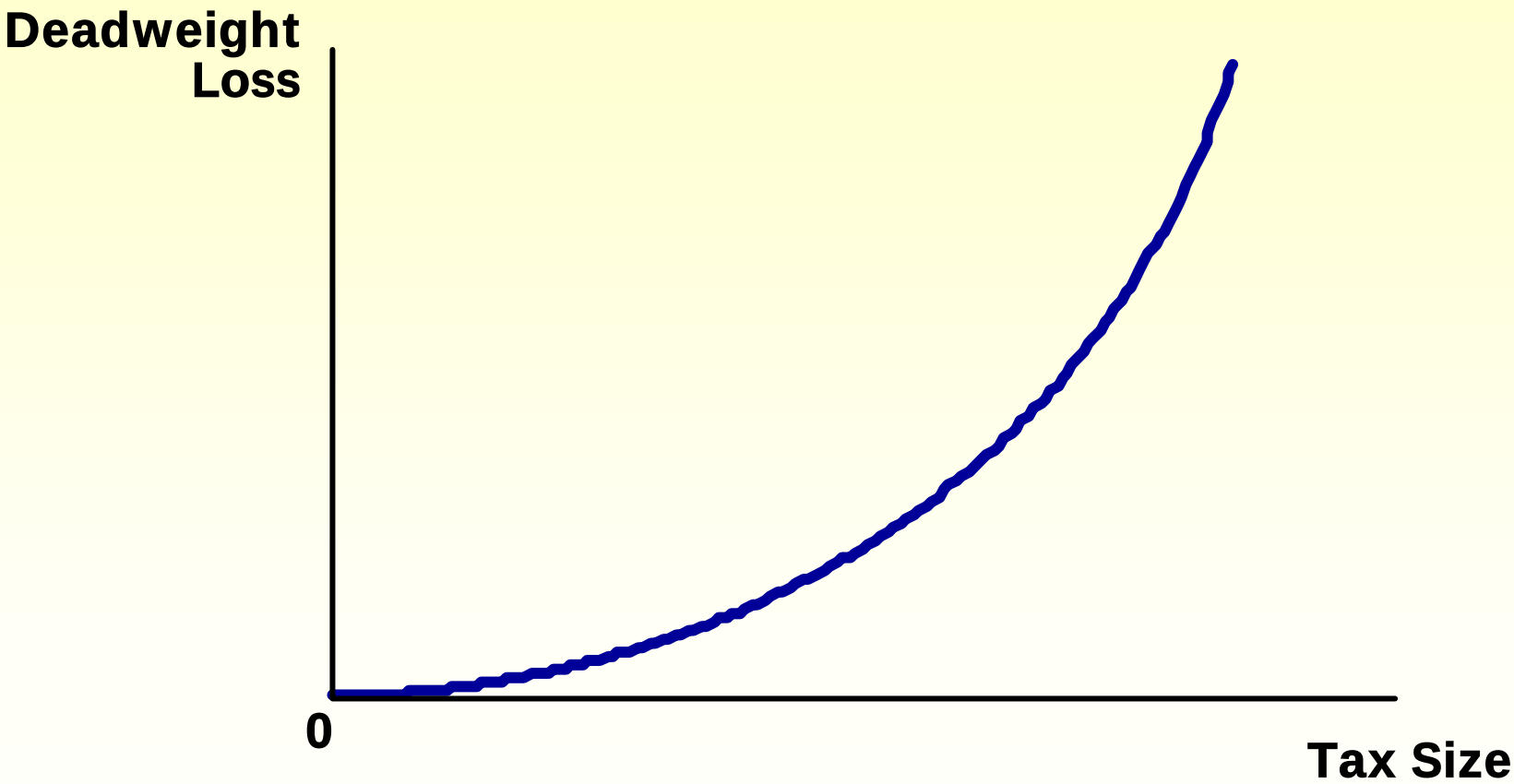
Deadweight Loss and Tax Revenue Vary with the Size of the Tax...

(a) Deadweight Loss



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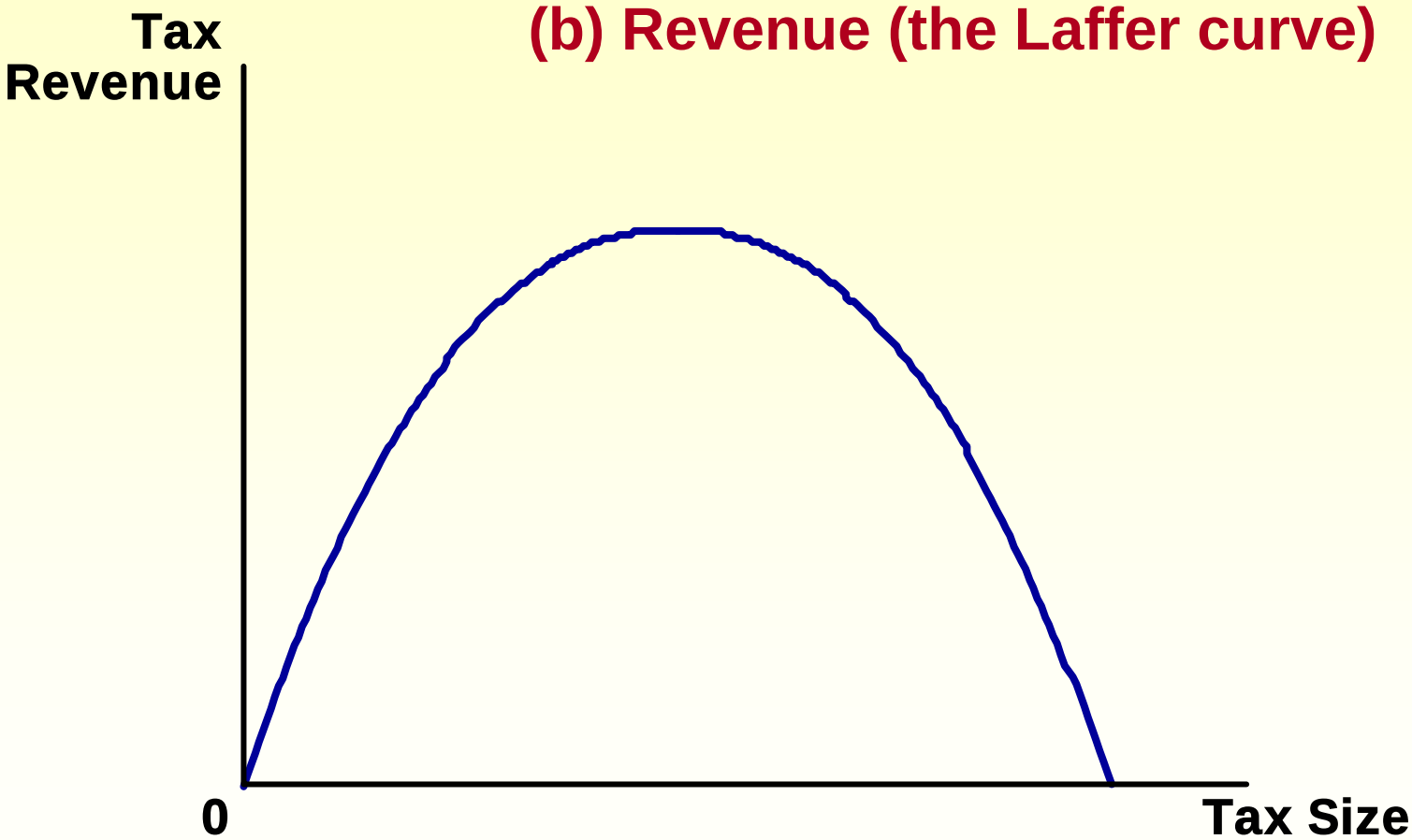
Deadweight Loss and Tax Revenue Vary with the Size of the Tax...



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Deadweight Loss and Tax Revenue Vary with the Size of the Tax

- As the size of a tax increases, its deadweight loss quickly gets larger.
- By contrast, tax revenue first rises with the size of a tax; but then, as the tax gets larger, the market shrinks so much that tax revenue starts to fall.

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The Laffer Curve and Supply-Side Economics

- The **Laffer curve** depicts the relationship between tax rates and tax revenue.
- **Supply-side economics** refers to the views of Reagan and Laffer who proposed that a tax cut would induce more people to work and thereby have the potential to increase tax revenues.

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Summary

- A tax on a good reduces the welfare of buyers and sellers of the good. And the reduction in consumer and producer surplus usually exceeds the revenues raised by the government.

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Summary

- The fall in total surplus – the sum of consumer surplus, producer surplus, and tax revenue – is called the deadweight loss of the tax.

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Summary

- Taxes have a deadweight loss because they cause buyers to consume less and sellers to produce less.
- This change in behavior shrinks the size of the market below the level that maximizes total surplus.

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Summary

- As a tax grows larger, it distorts incentives more, and its deadweight loss grows larger.
- Tax revenue first rises with the size of a tax.
- Eventually, however, a larger tax reduces tax revenue because it reduces the size of the market.

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Graphical Review

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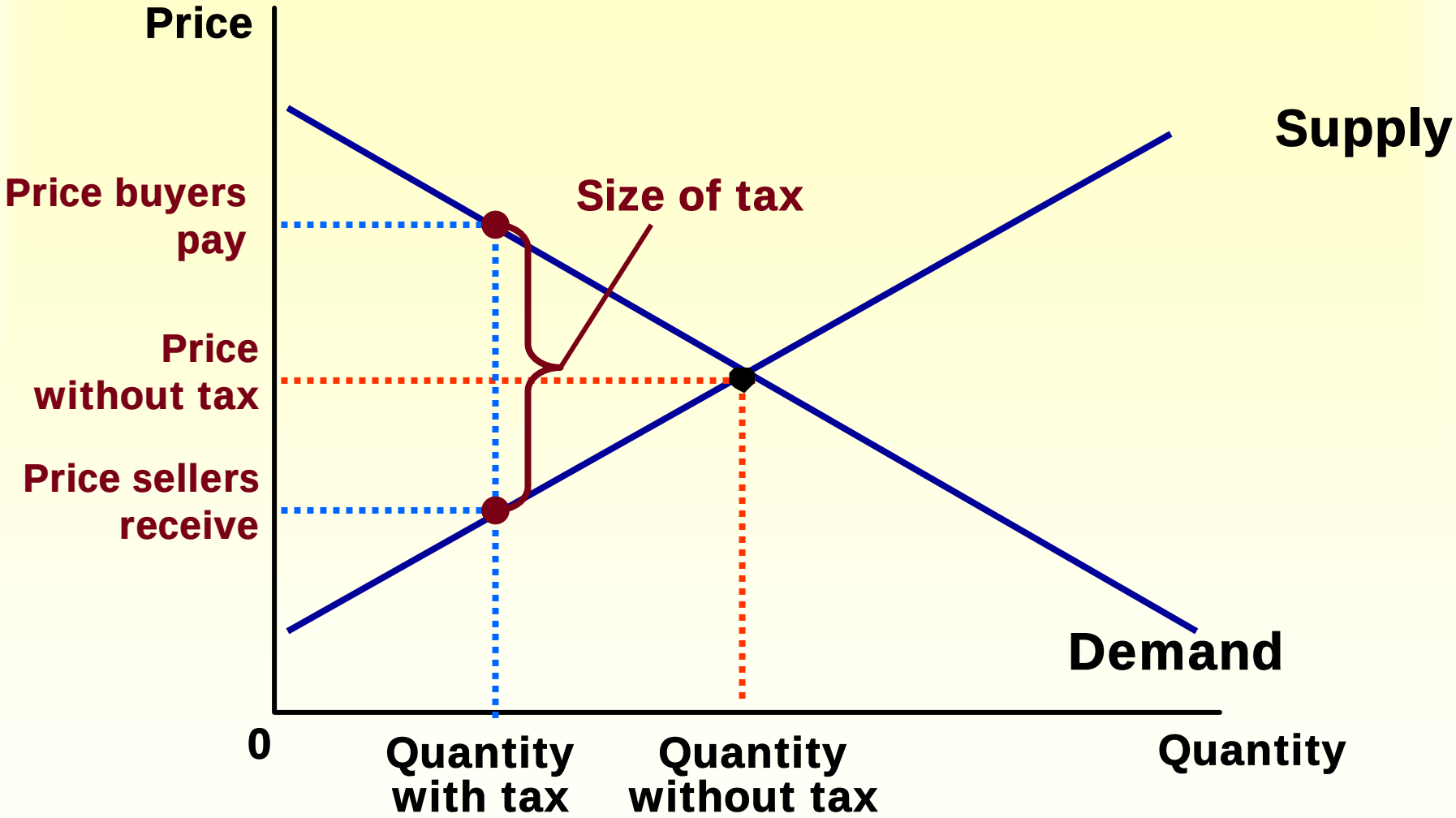

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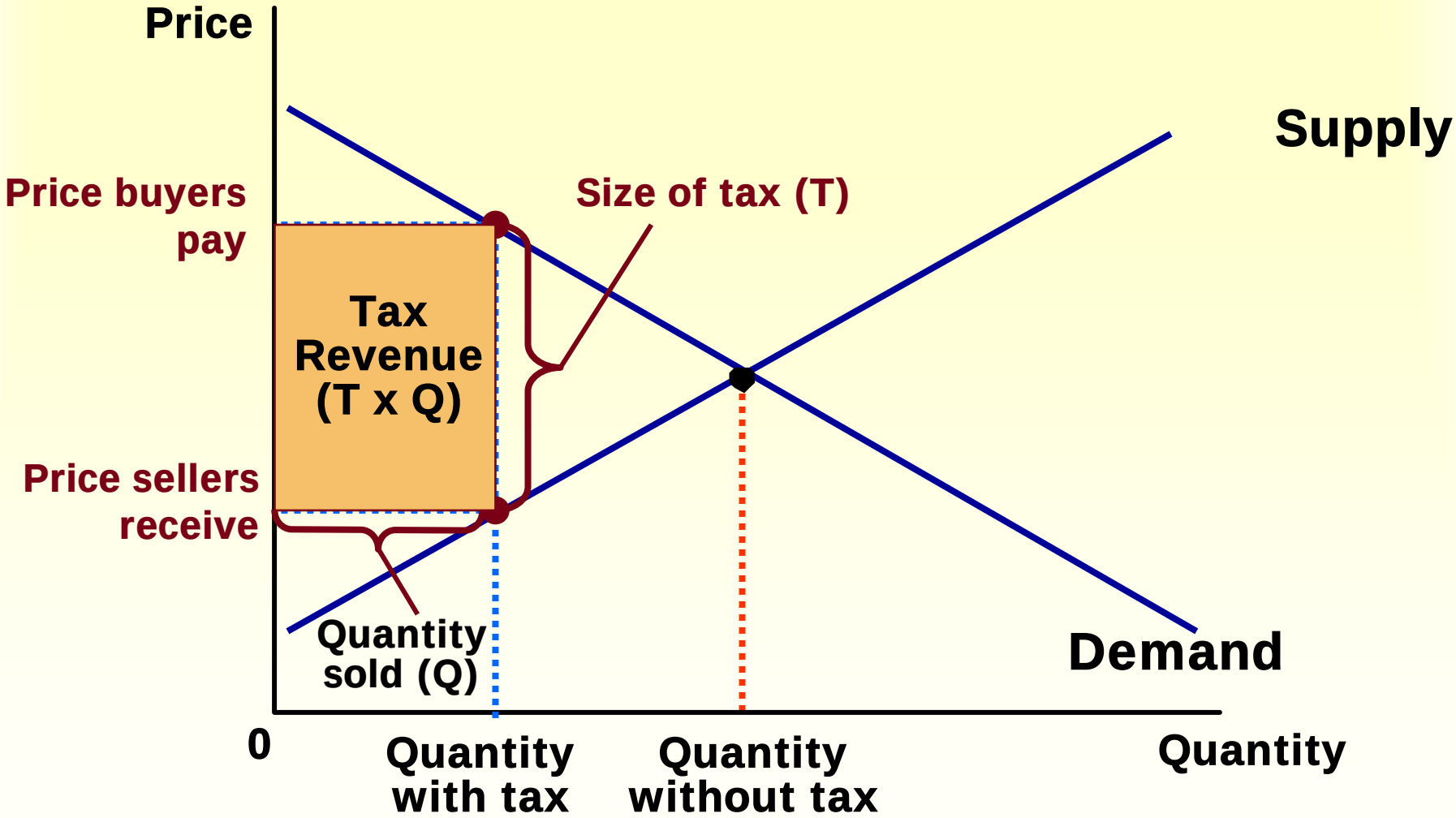
Tax Revenue...



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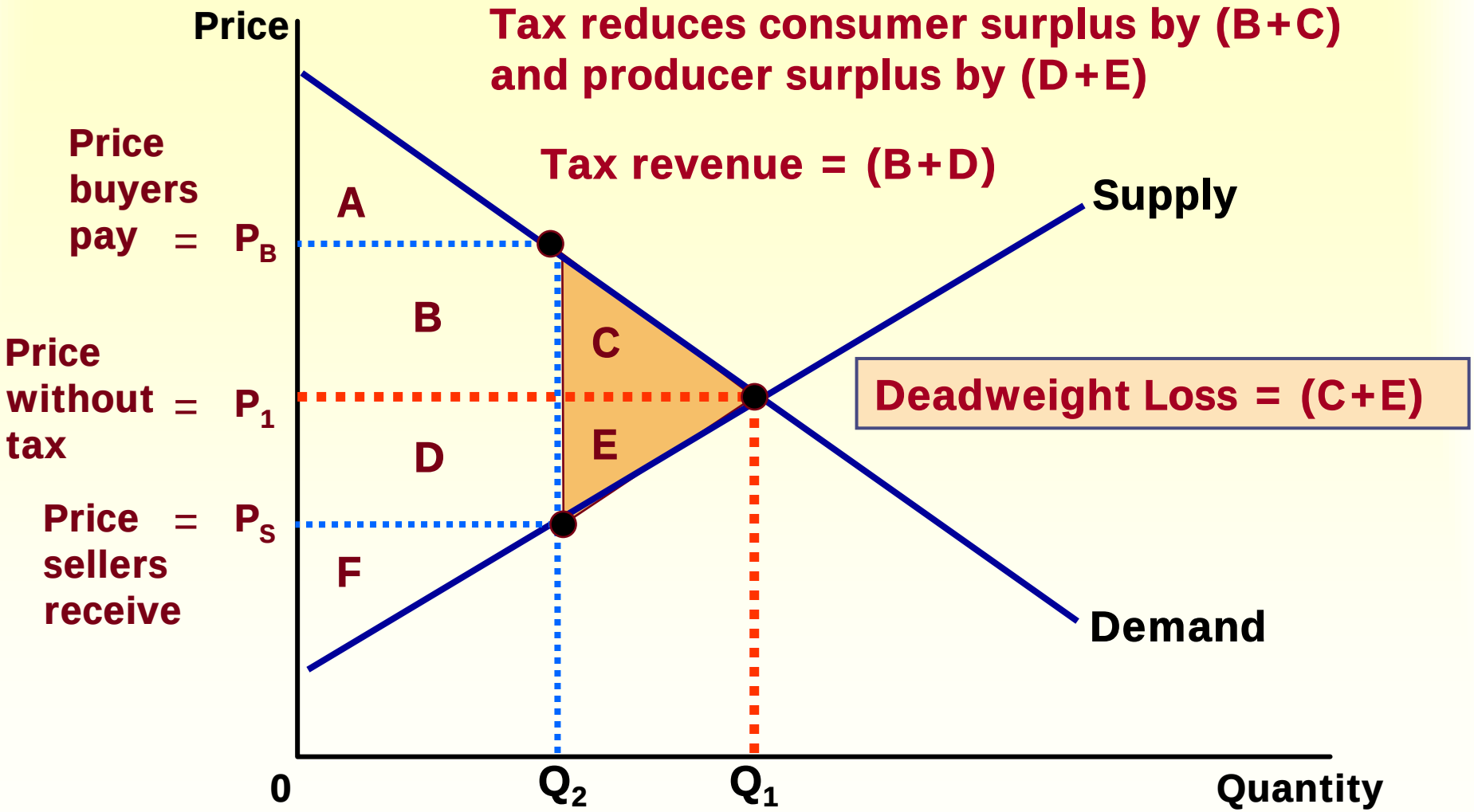
How a Tax Affects Welfare...



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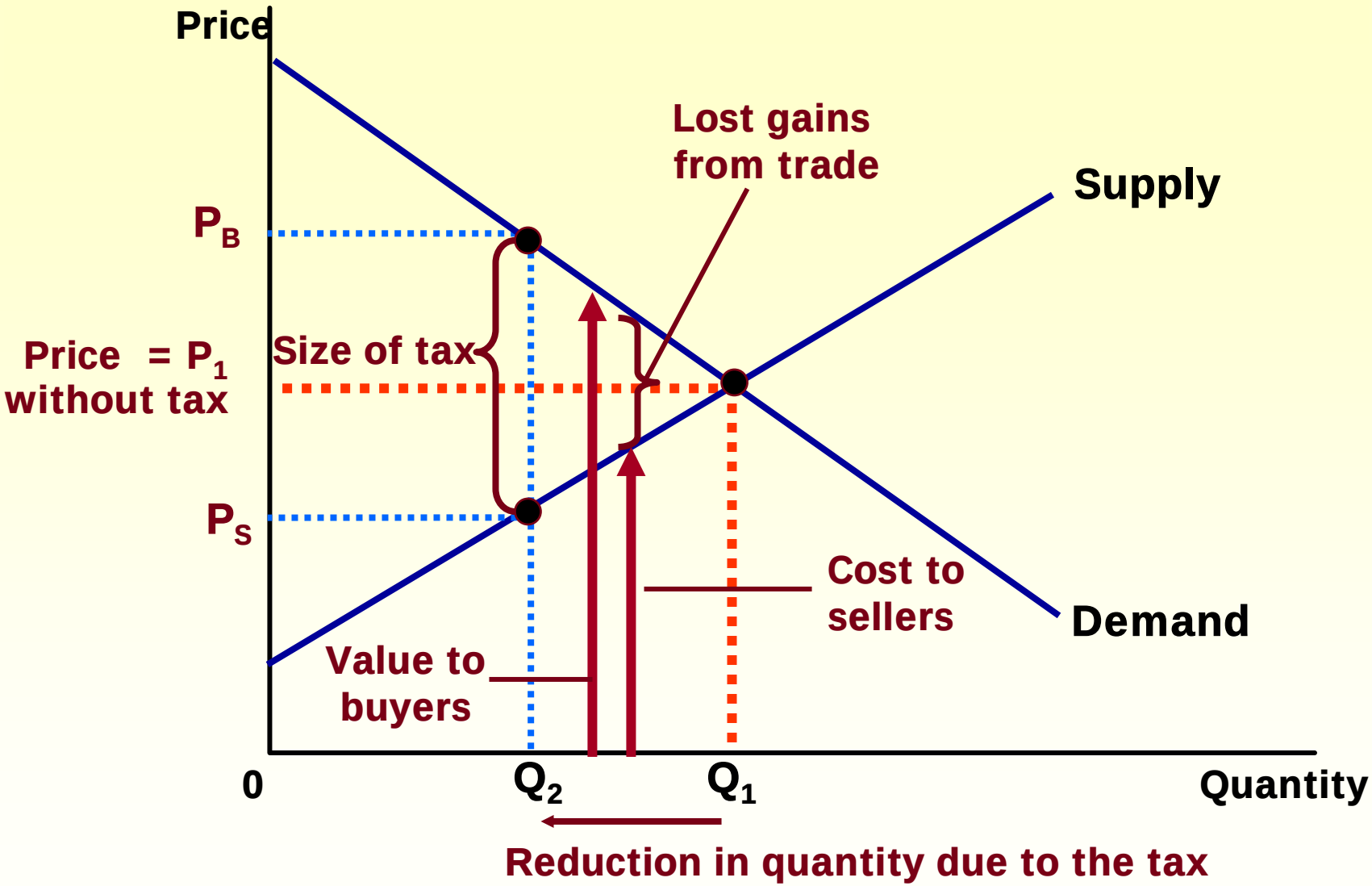
The Deadweight Loss...



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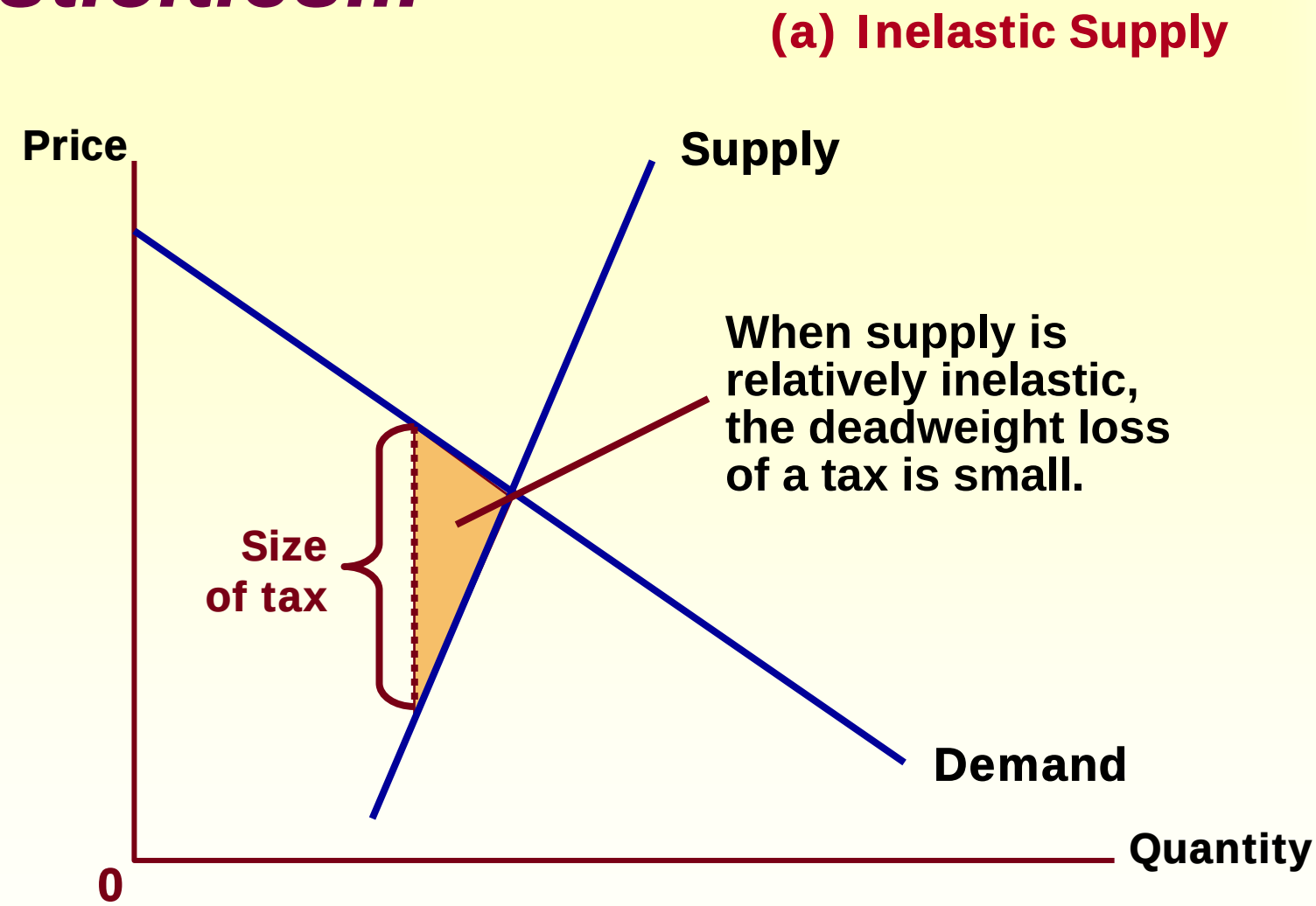

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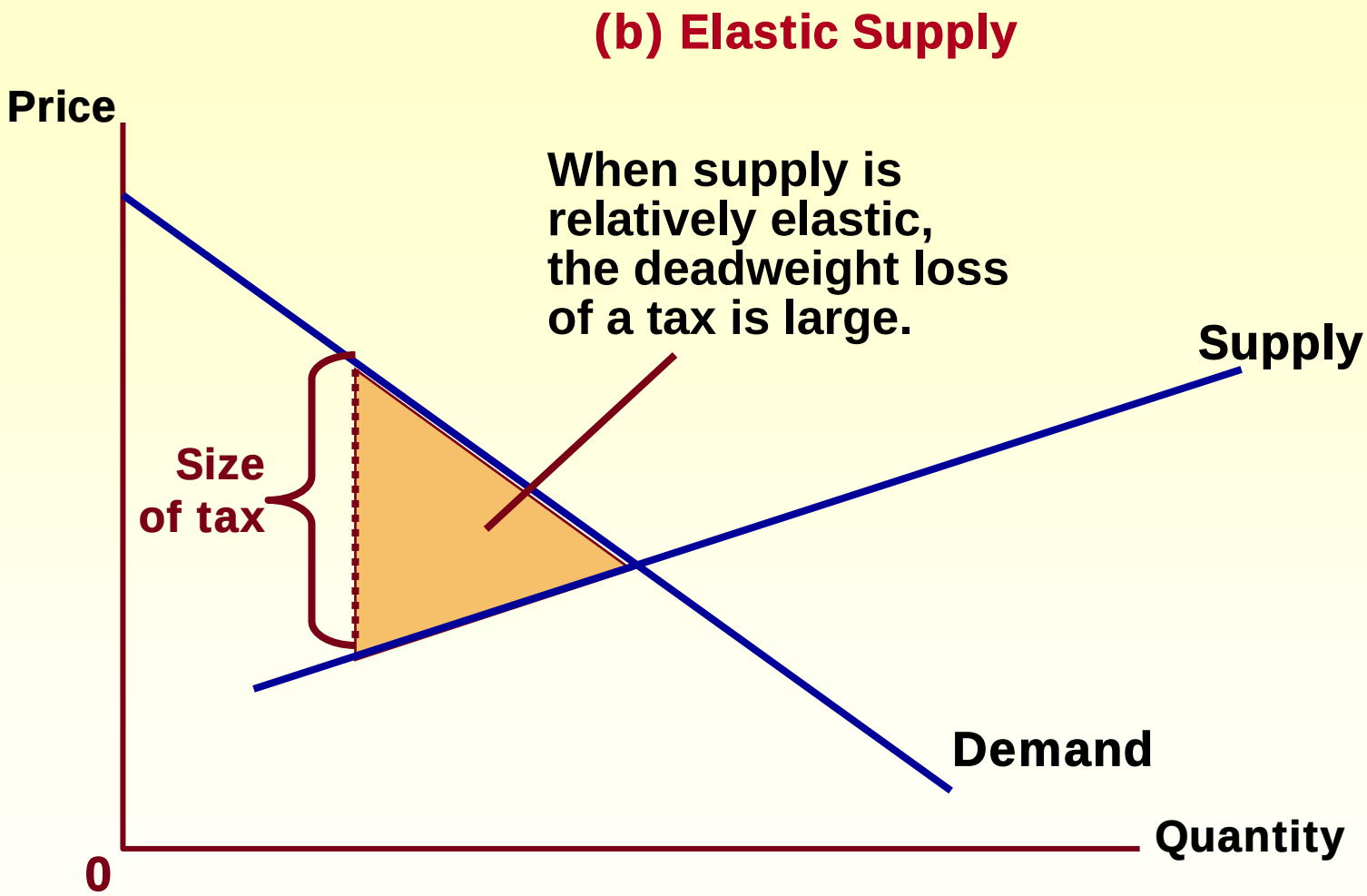
Tax Distortions and Elasticities...



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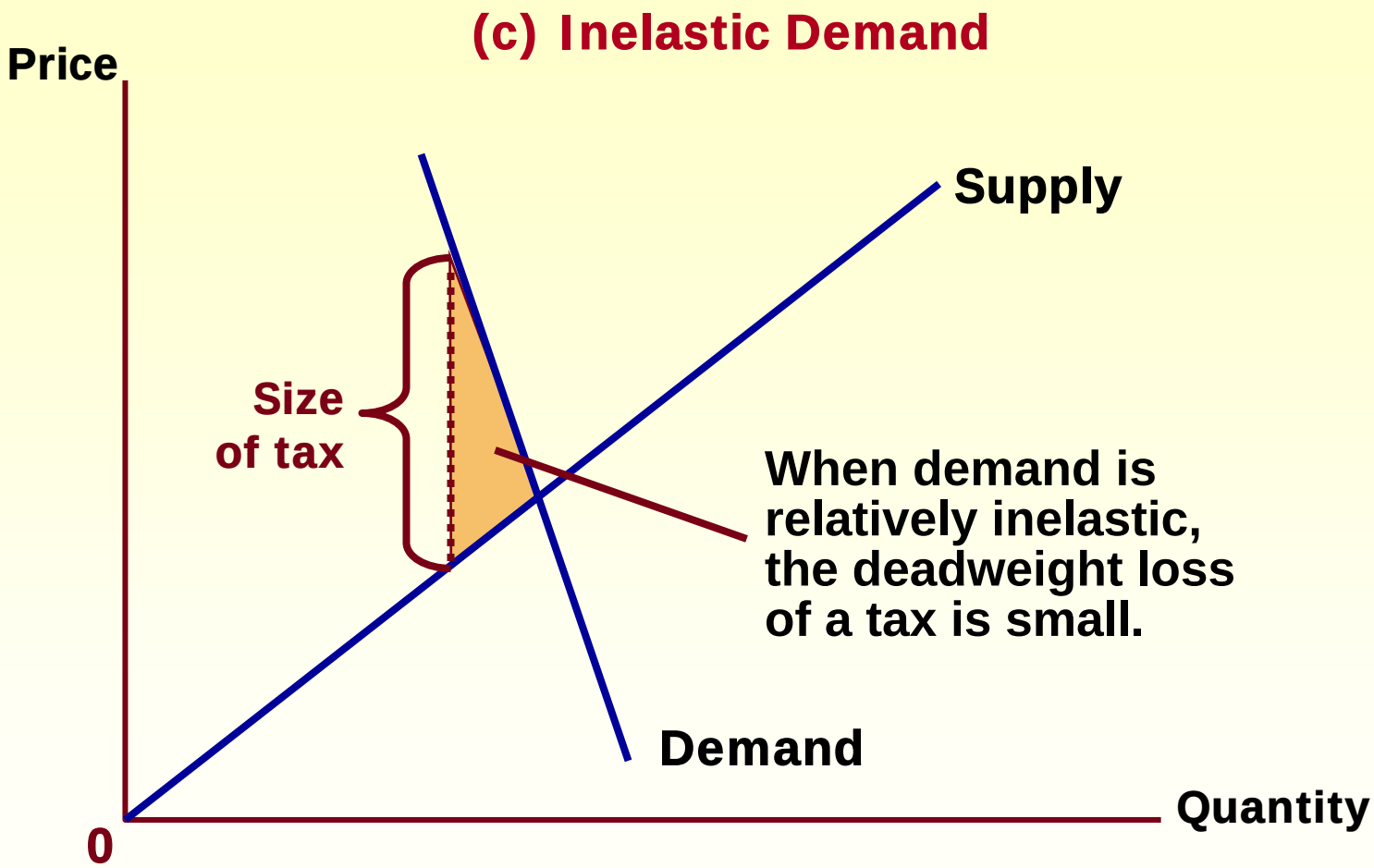
Tax Distortions and Elasticities...



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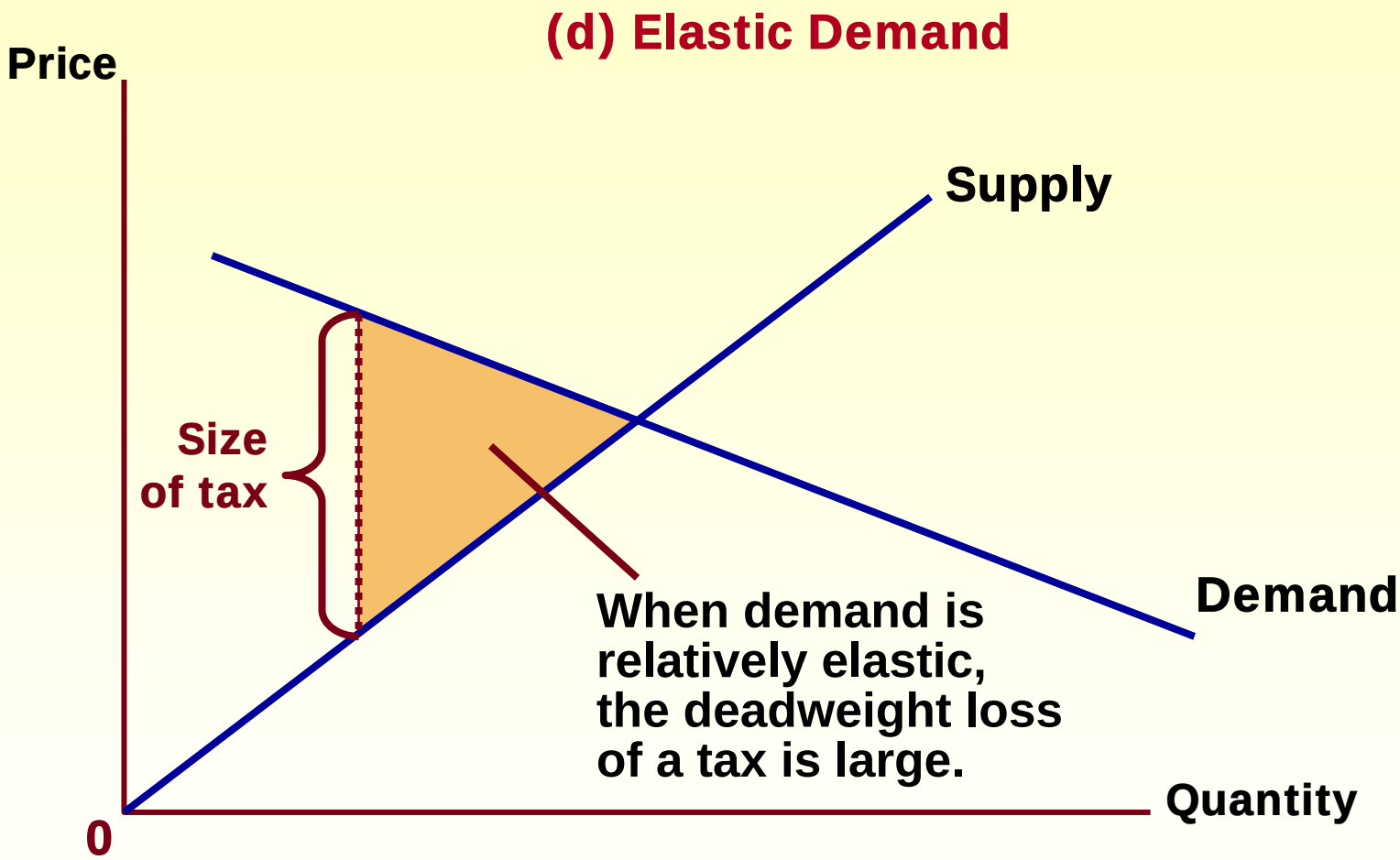
Tax Distortions and Elasticities...



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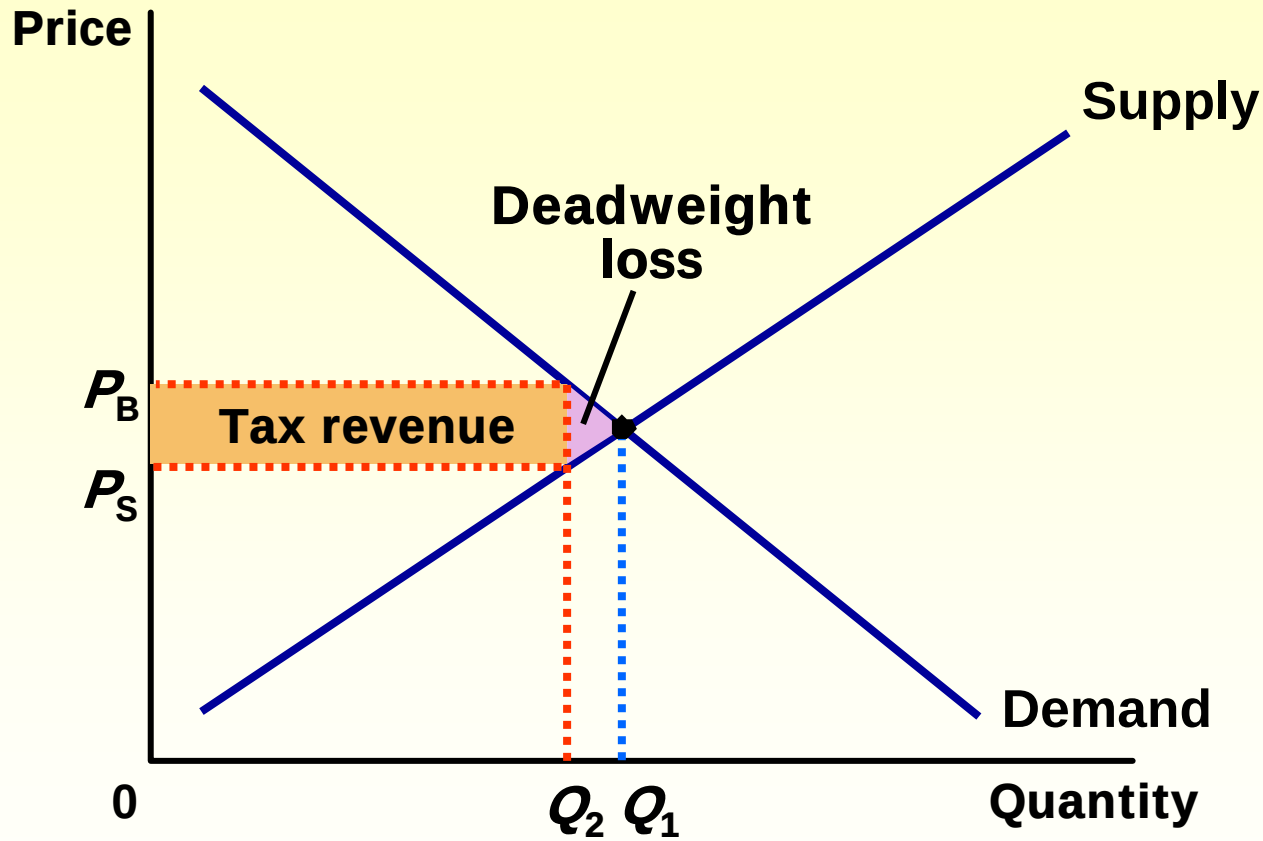
Deadweight Loss and Tax Revenue...

(a) Small Tax



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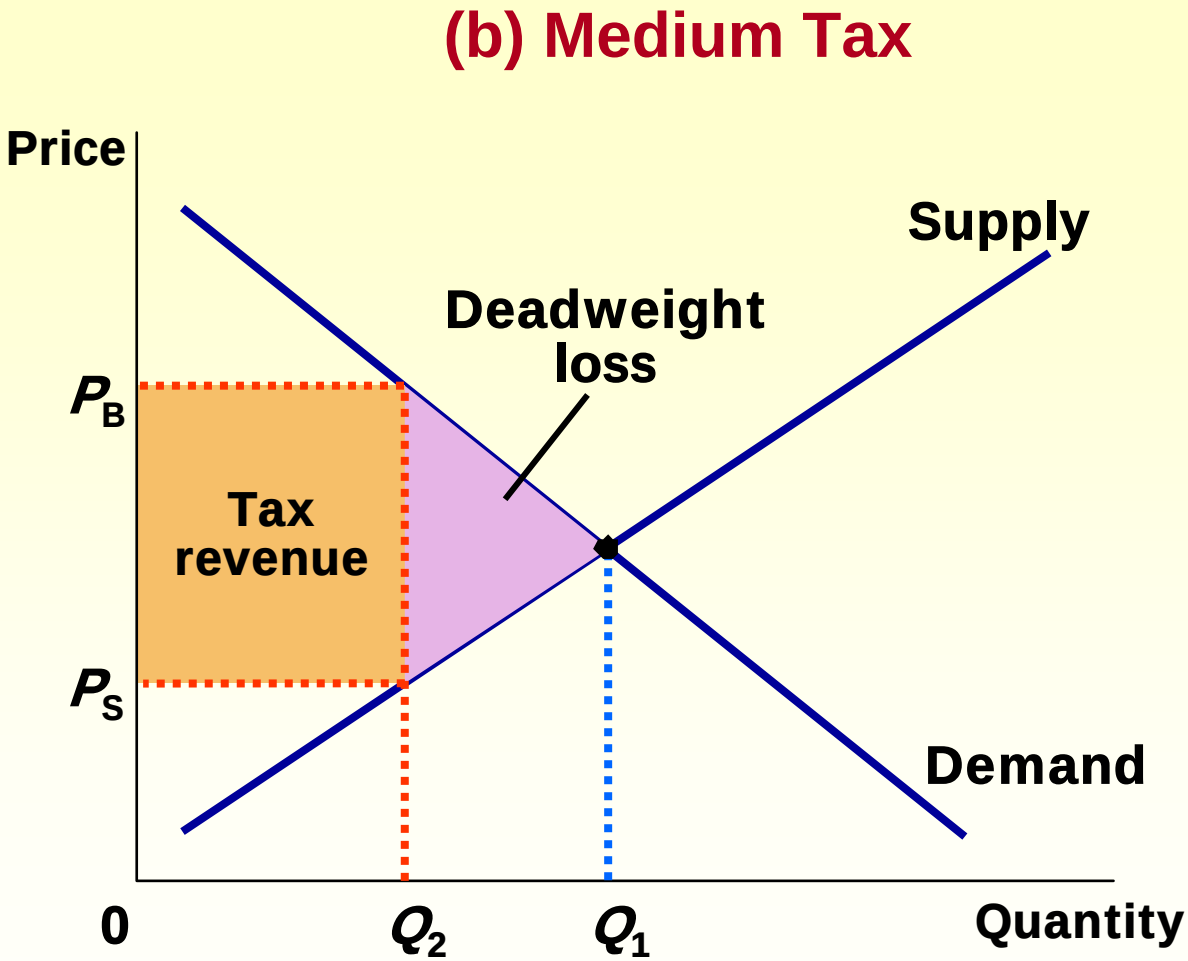
Deadweight Loss and Tax Revenue...



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Deadweight Loss and Tax Revenue...

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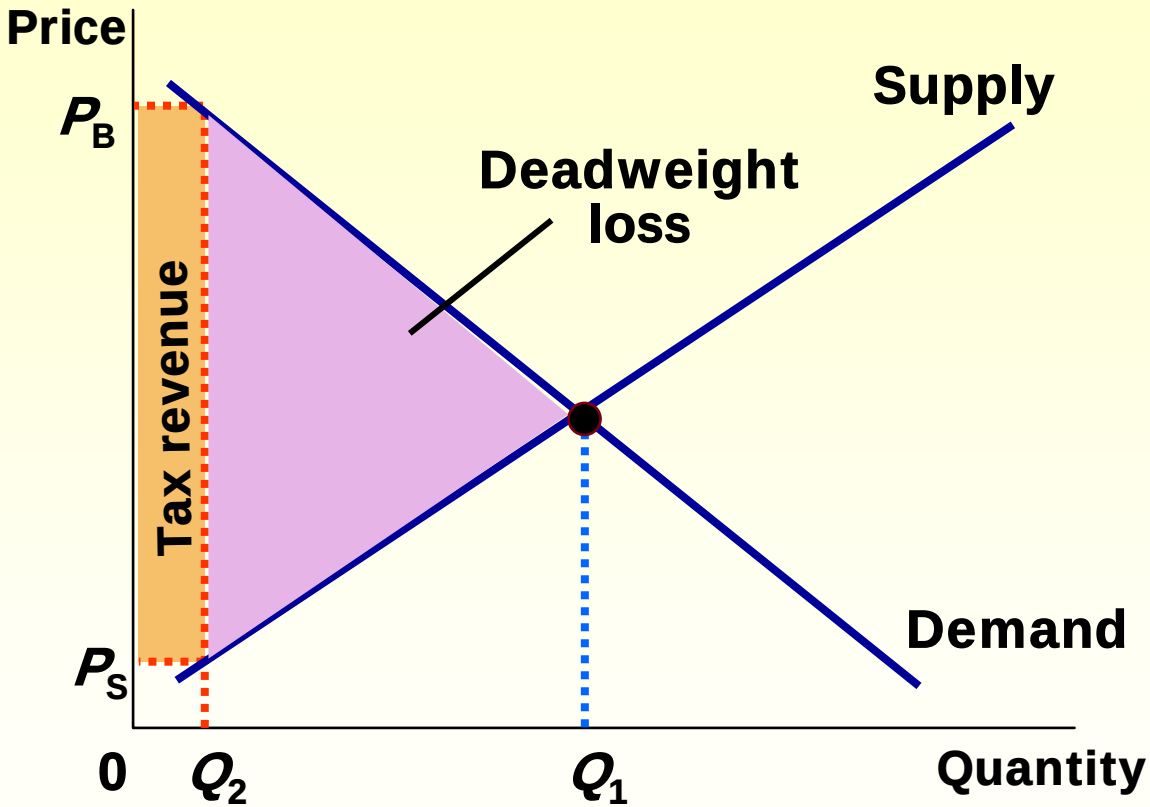

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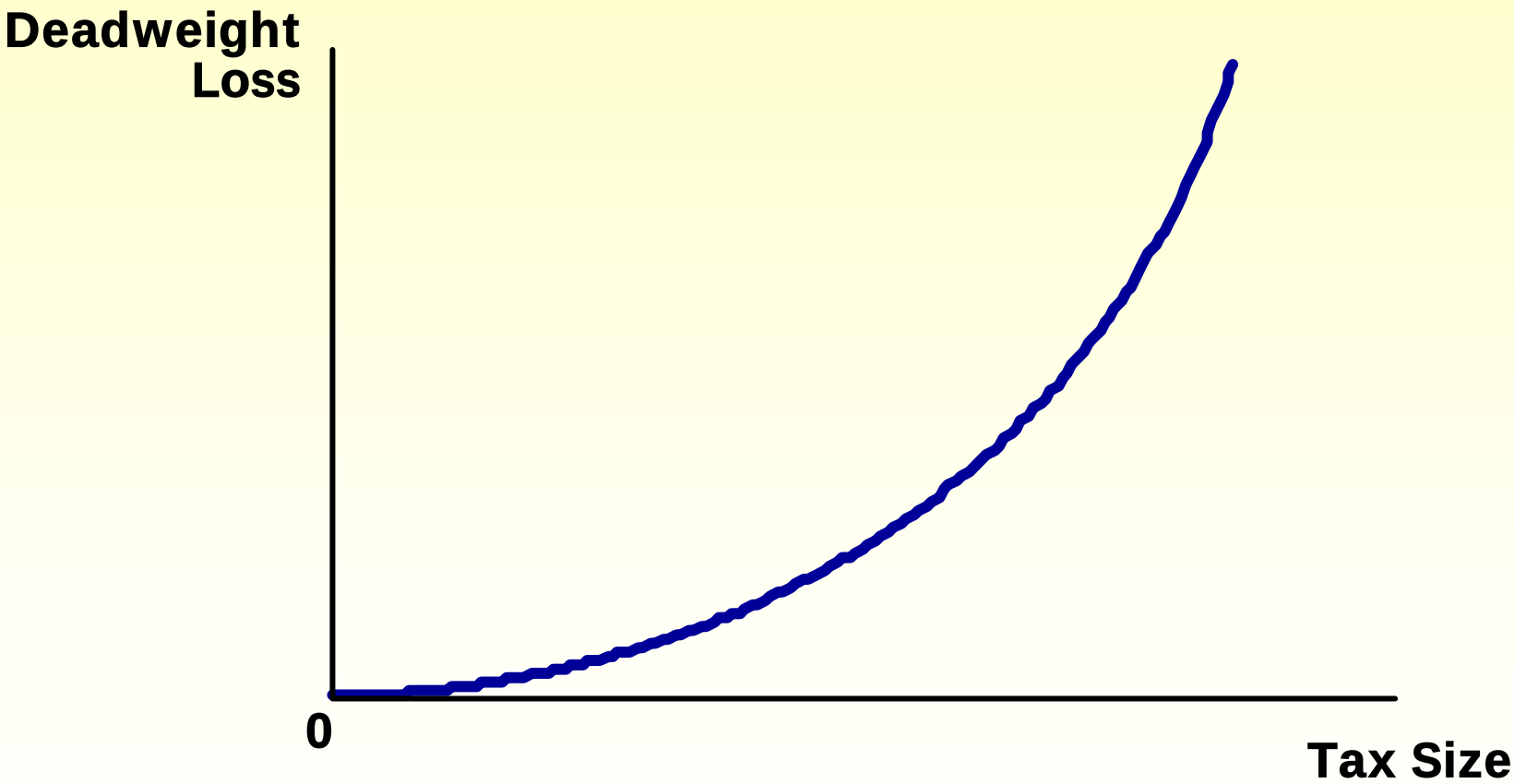
Deadweight Loss and Tax Revenue Vary with the Size of the Tax...

(a) Deadweight Loss



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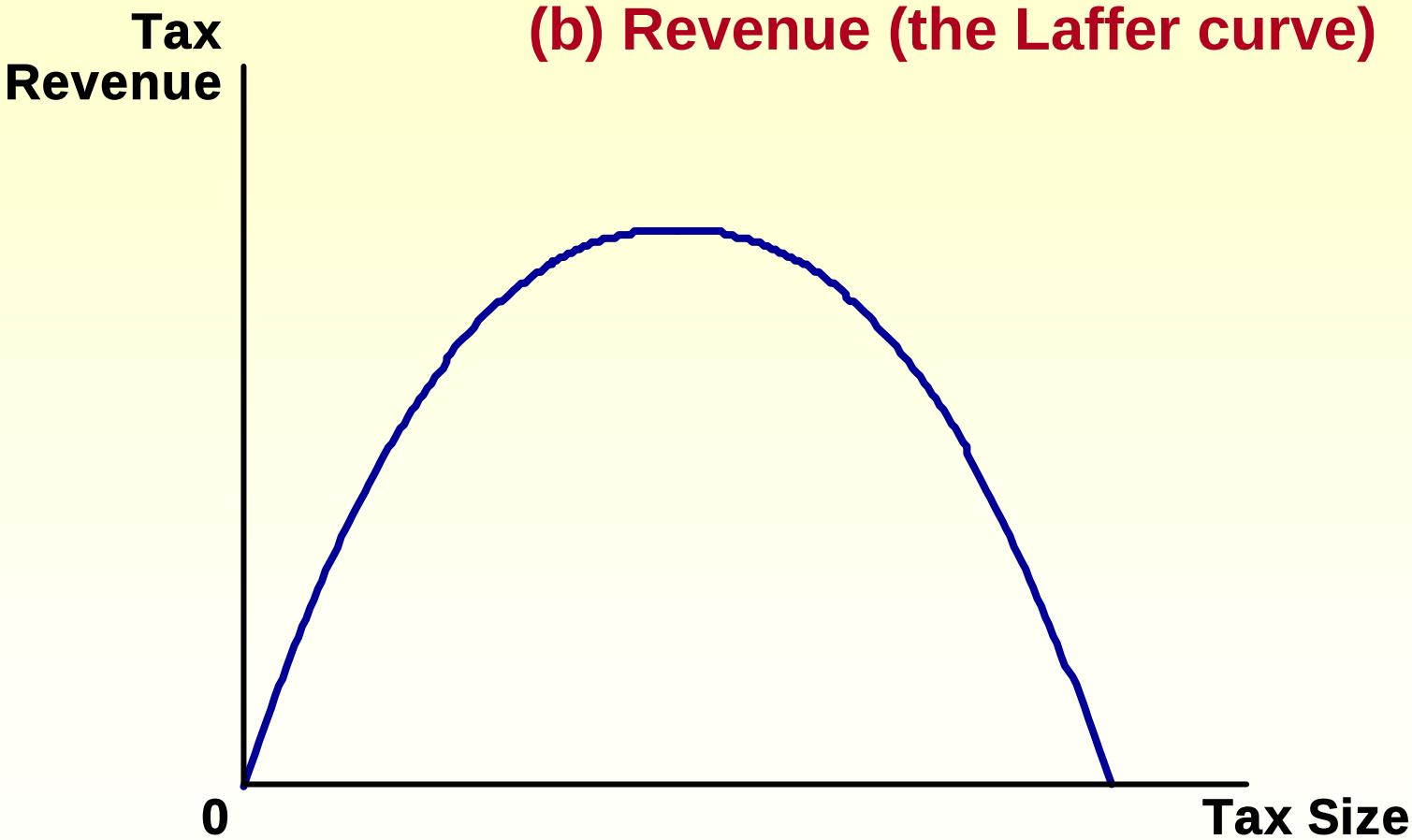
Deadweight Loss and Tax Revenue Vary with the Size of the Tax...



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Application: International Trade

Chapter 9

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International Trade

What determines whether a country imports or exports a good?

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International Trade

Who gains and who loses from free trade among countries?

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International Trade

What are the arguments that people use to advocate trade restrictions?

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Equilibrium Without Trade

Assume:

- A country is isolated from rest of the world and produces steel.
- The market for steel consists of the buyers and sellers in the country.
- No one in the country is allowed to import or export steel.

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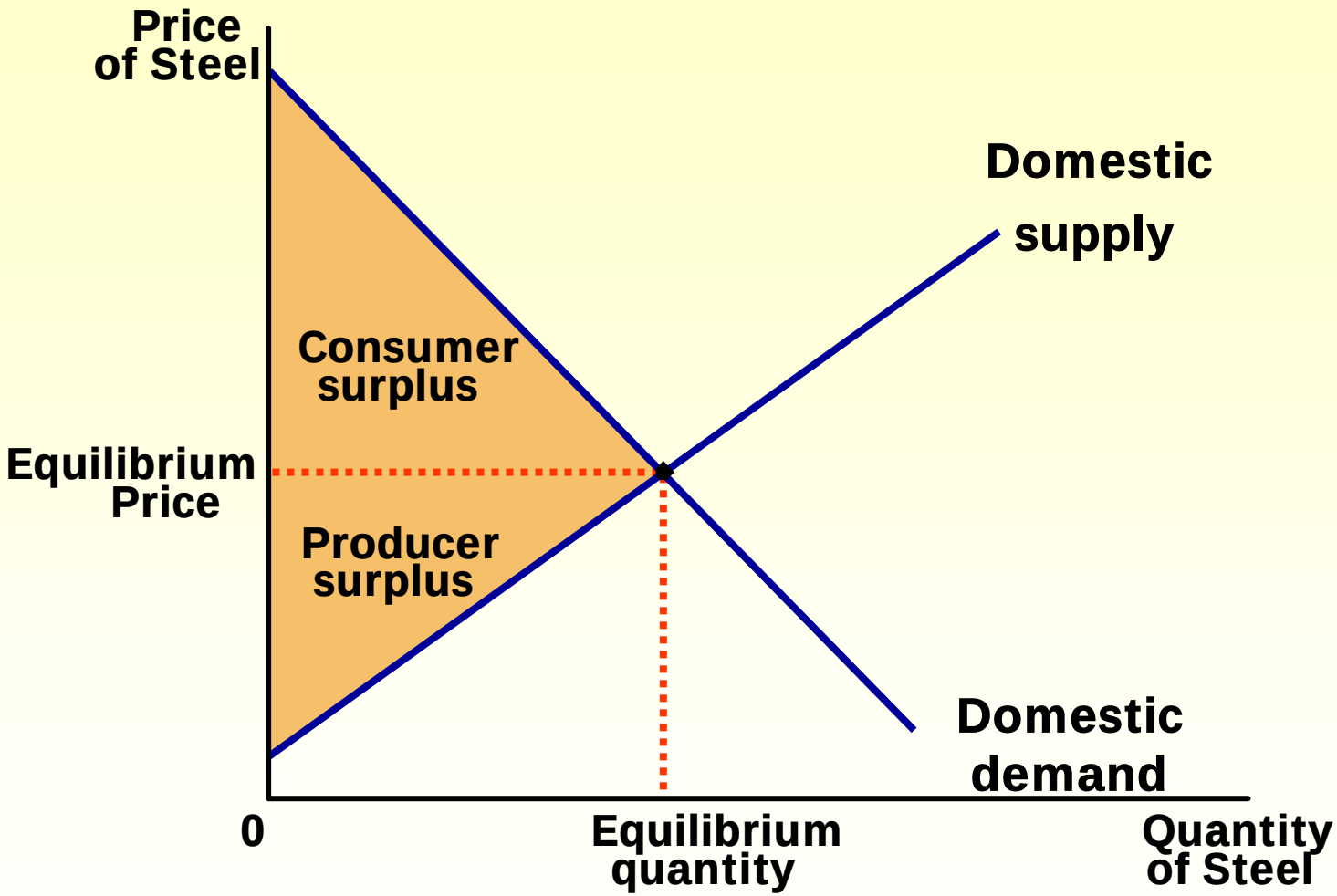
Equilibrium Without Trade...



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Equilibrium Without Trade

Results:

- **Domestic price adjusts to balance demand and supply.**
- **The sum of consumer and producer surplus measures the total benefits that buyers and sellers receive.**

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World Price and Comparative Advantage

If the country decides to engage in international trade, will it be an importer or exporter of steel?

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World Price and Comparative Advantage

The effects of free trade can be shown by comparing the domestic price of a good without trade and the world price of the good. The world price refers to the prevailing price in the world markets.

- **A country will either be an exporter or an importer of the good.**

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World Price and Comparative Advantage

If a country has a comparative advantage, then the domestic price will be below the world price, and the country will be an exporter of the good.

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World Price and Comparative Advantage

If the country does not have a comparative advantage, then the domestic price will be higher than the world price, and the country will be an importer of the good.

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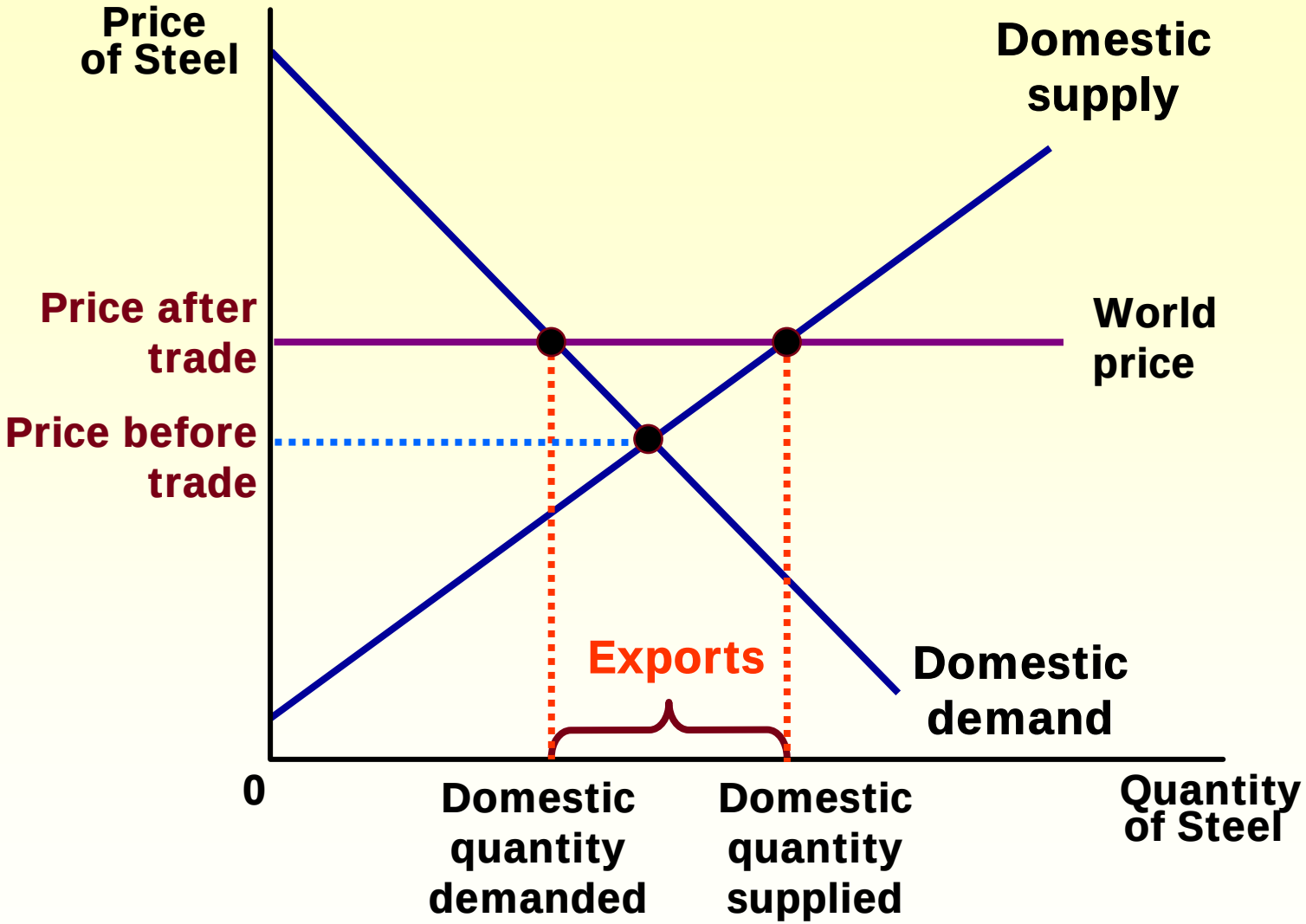
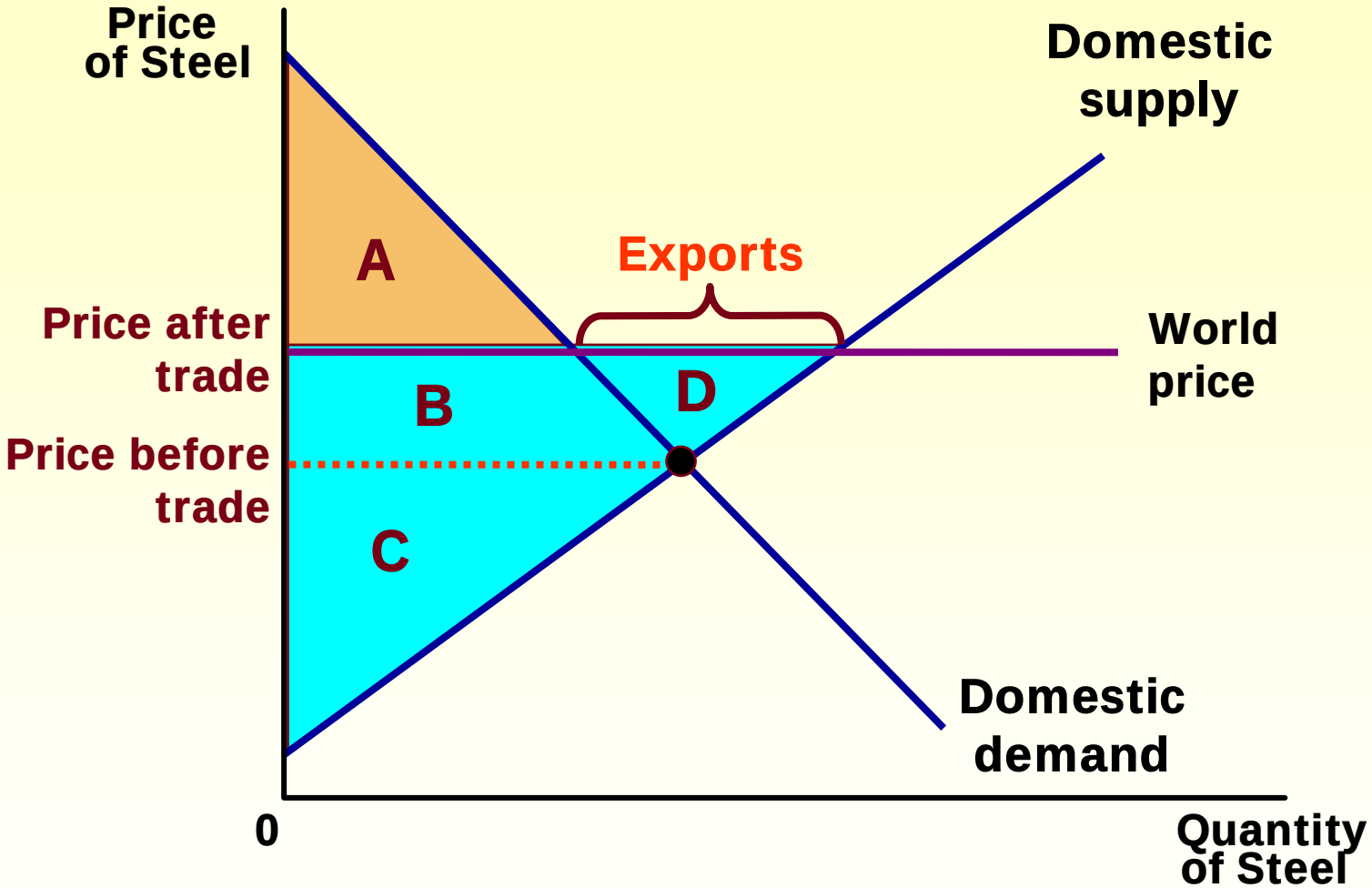
International Trade in an Exporting Country...



How Free Trade Affects Welfare in an Exporting Country...



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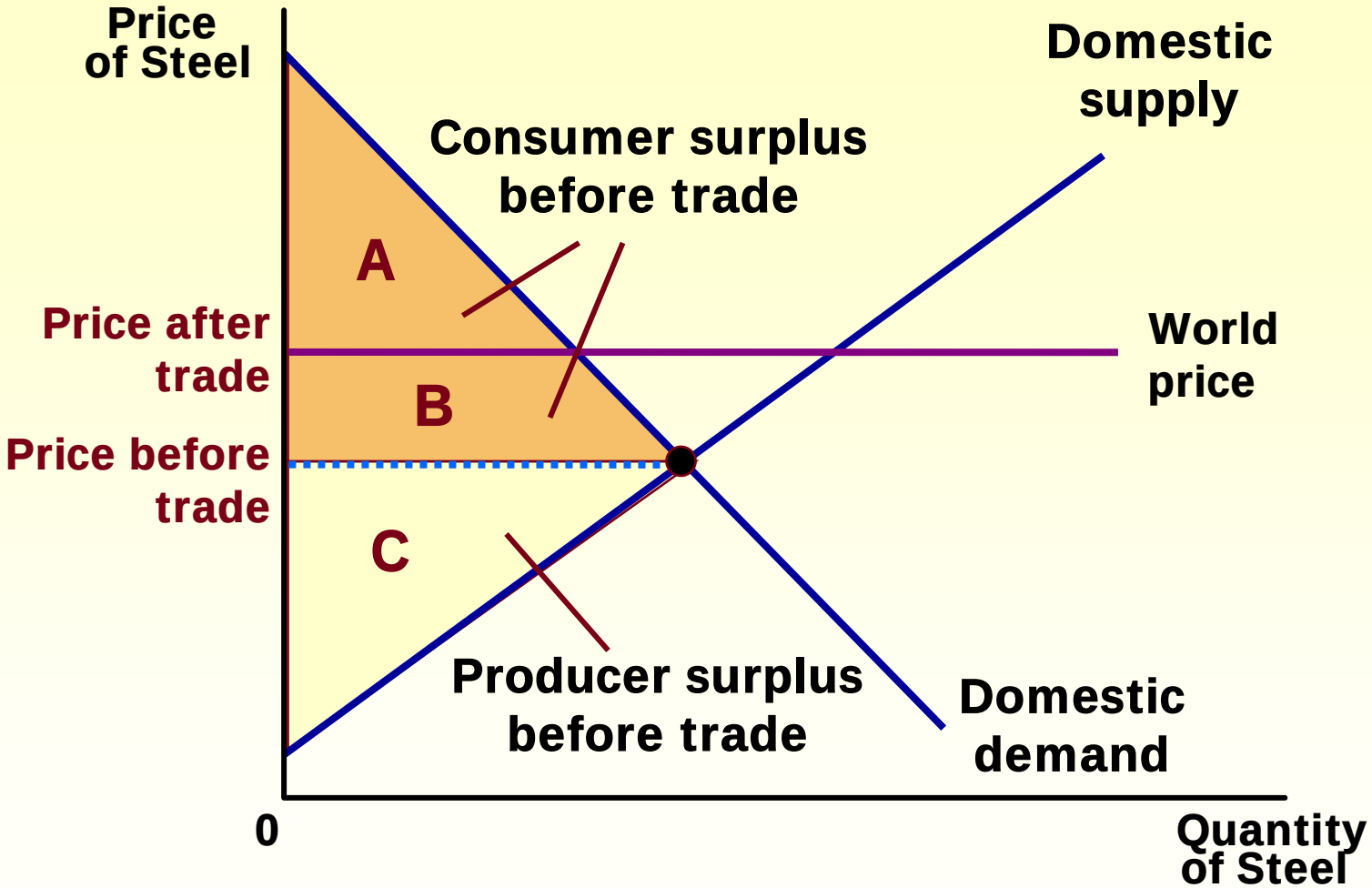
How Free Trade Affects Welfare in an Exporting Country...



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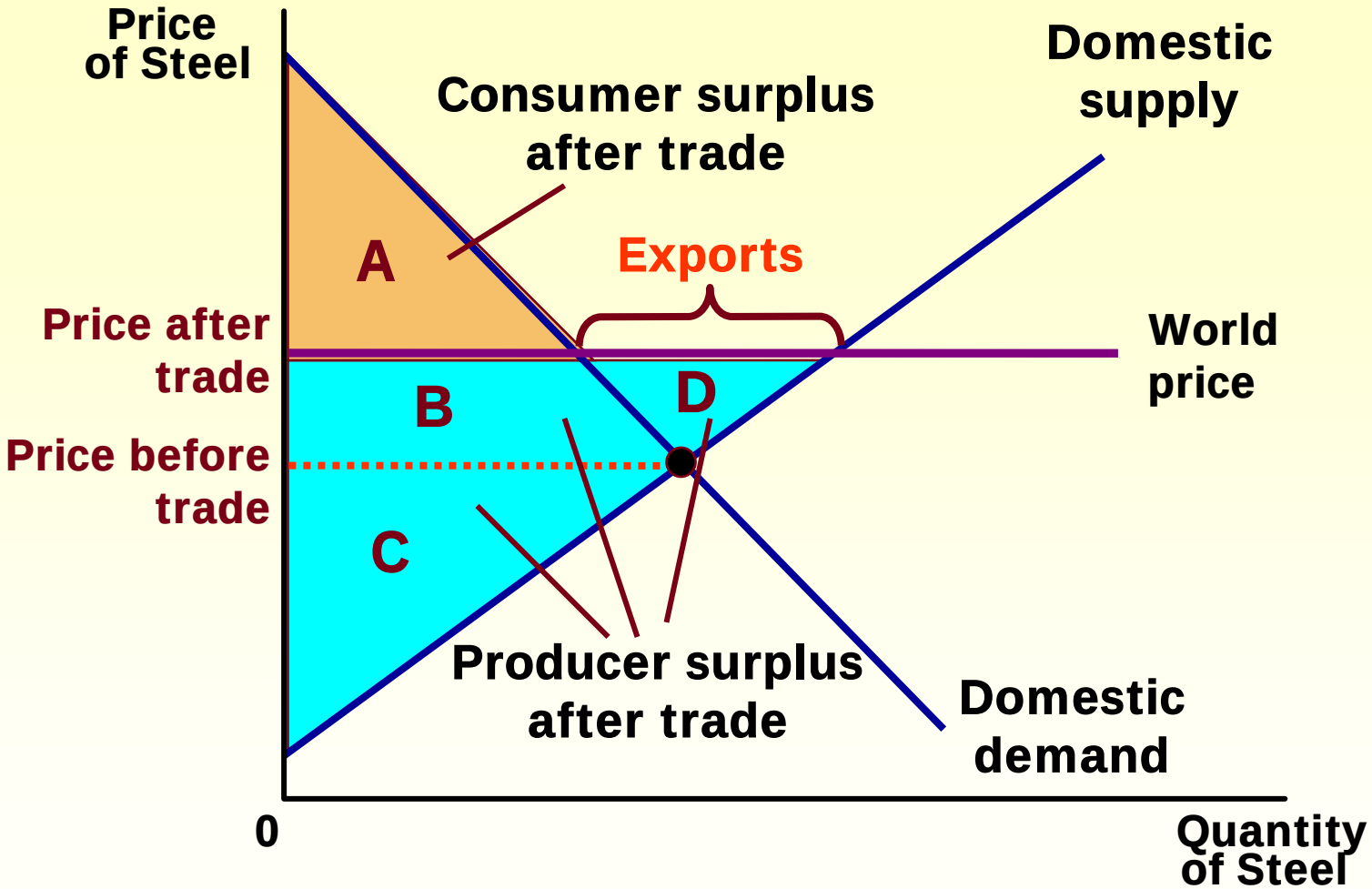
How Free Trade Affects Welfare in an Exporting Country...



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Changes in Welfare from Free Trade: The Case of an Exporting Country

	Before Trade	After Trade	Change
Consumer Surplus	A + B	A	- B
Producer Surplus	C	B + C + D	+ (B + D)
Total Surplus	A + B + C	A + B + C + D	+ D

The area D shows the increase in total surplus and represents the **gains from trade.**

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How Free Trade Affects Welfare in an Exporting Country

The analysis of an exporting country yields two conclusions:

- **Domestic producers of the good are better off, and domestic consumers of the good are worse off.**
- **Trade raises the economic well-being of the nation as a whole.**

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International Trade and the Importing Country

If the world price of steel is lower than the domestic price, the country will be an importer of steel when trade is permitted.

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International Trade and the Importing Country

Domestic consumers will want to buy steel at the lower world price.

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International Trade and the Importing Country

Domestic producers of steel will have to lower their output because the domestic price moves to the world price.

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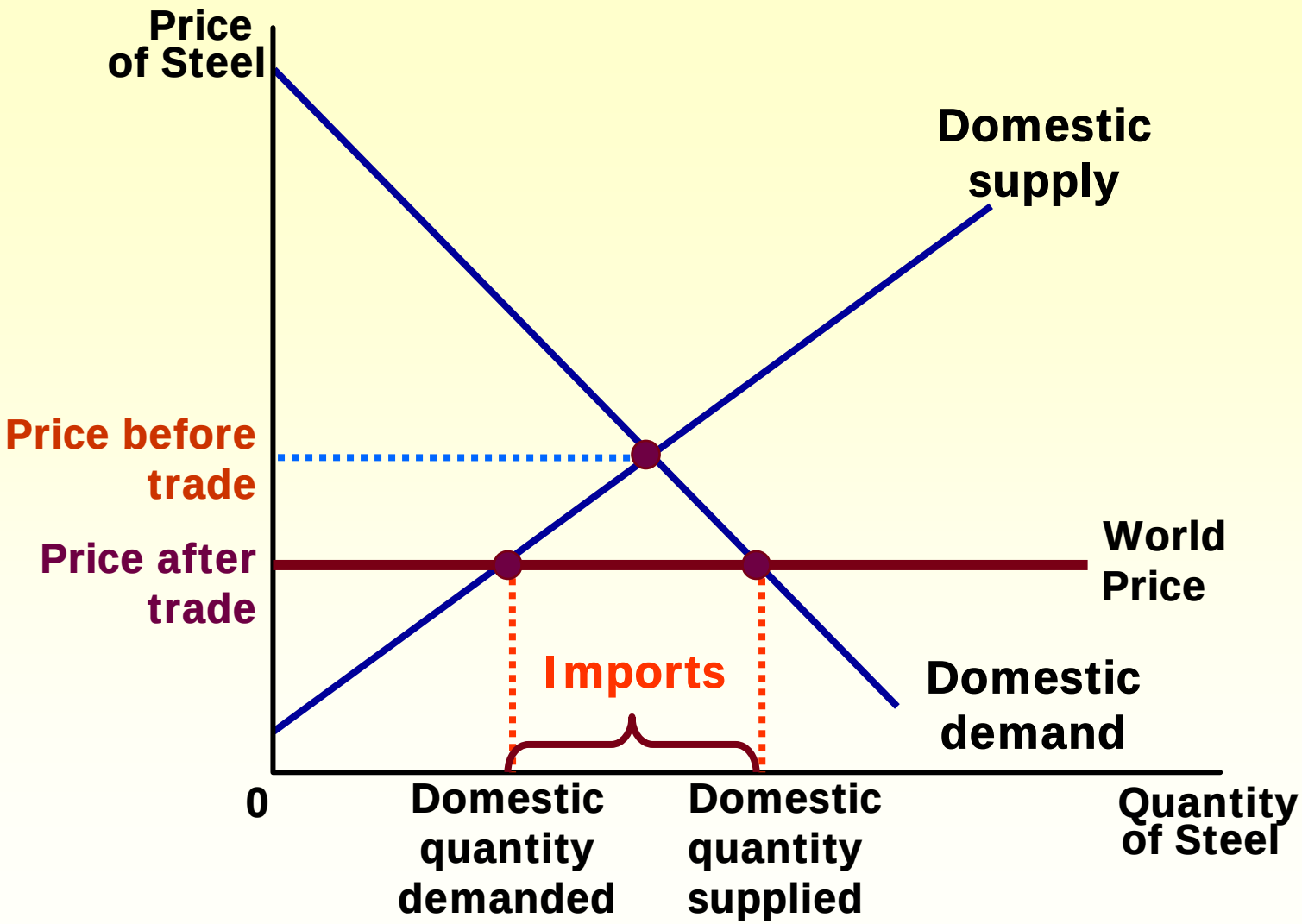
International Trade and the Importing Country...



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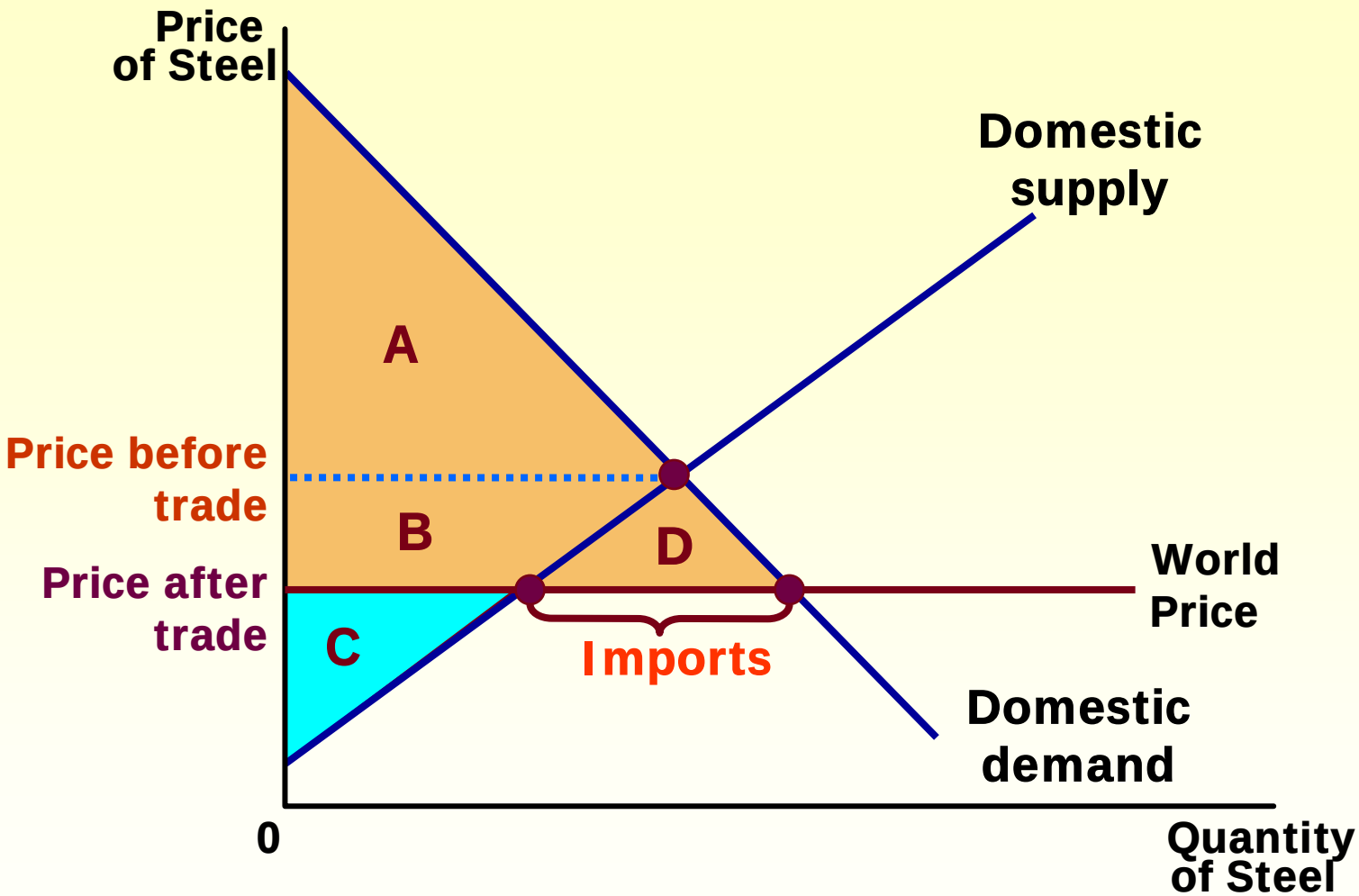
How Free Trade Affects Welfare in an Importing Country...



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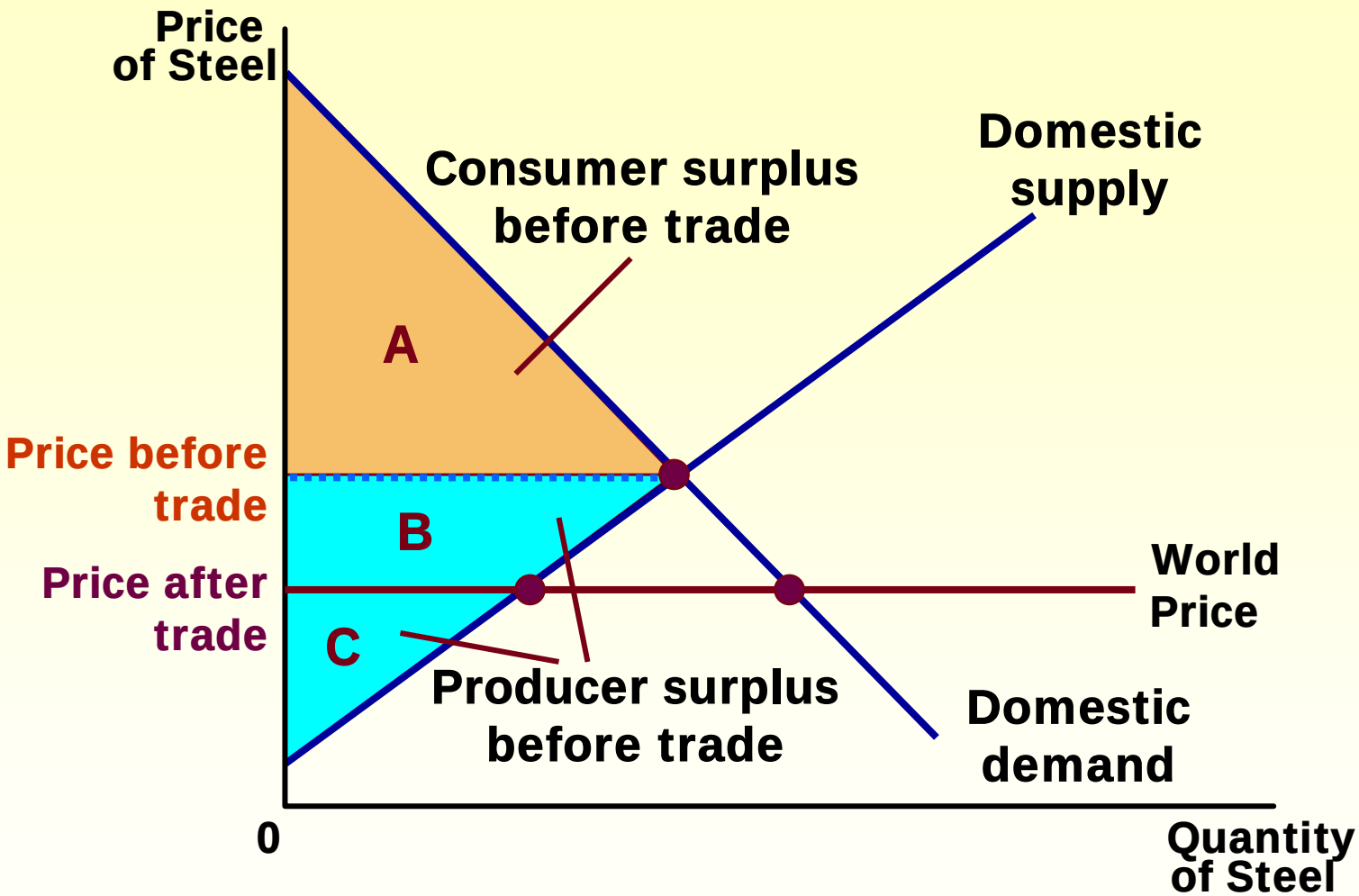

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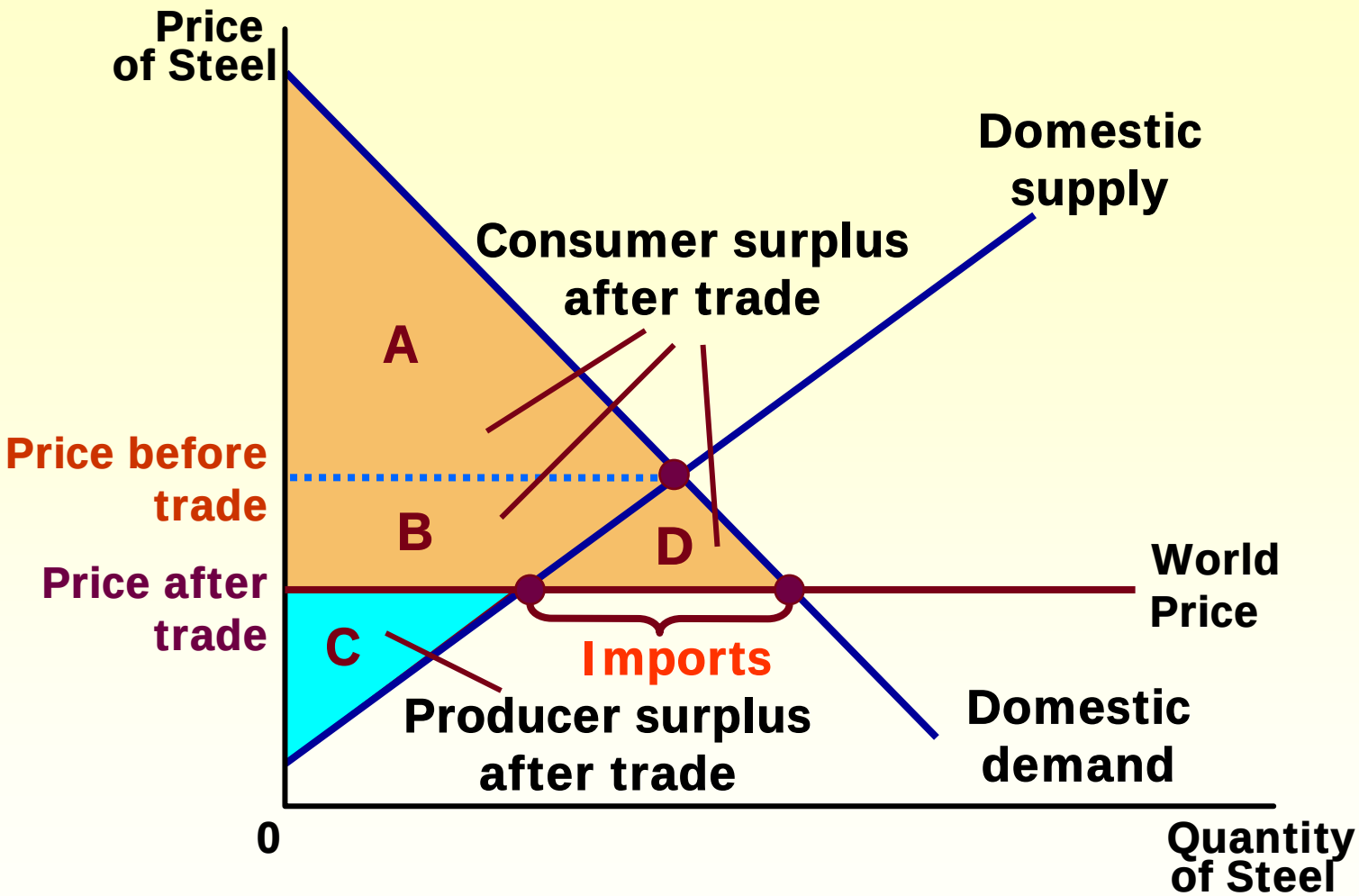
How Free Trade Affects Welfare in an Importing Country...



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Changes in Welfare from Free Trade: The Case of an Importing Country

	Before Trade	After Trade	Change
Consumer Surplus	A	A + B + D	+ (B + D)
Producer Surplus	B + C	C	- B
Total Surplus	A + B + C	A + B + C + D	+ D

The area D shows the increase in total surplus and represents the **gains from trade.**

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How Free Trade Affects Welfare in an Importing Country

The analysis of an importing country yields two conclusions:

- **Domestic producers of the good are worse off, and domestic consumers of the good are better off.**
- **Trade raises the economic well-being of the nation as a whole because the gains of consumers exceed the losses of producers.**

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The Gains and Losses from Free International Trade

- The gains of the winners exceed the losses of the losers.
- The net change in total surplus is positive.

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Tariffs

- **Tariffs** are taxes on imported goods.
- **Tariffs** raise the price of imported goods above the world price by the amount of the tariff.

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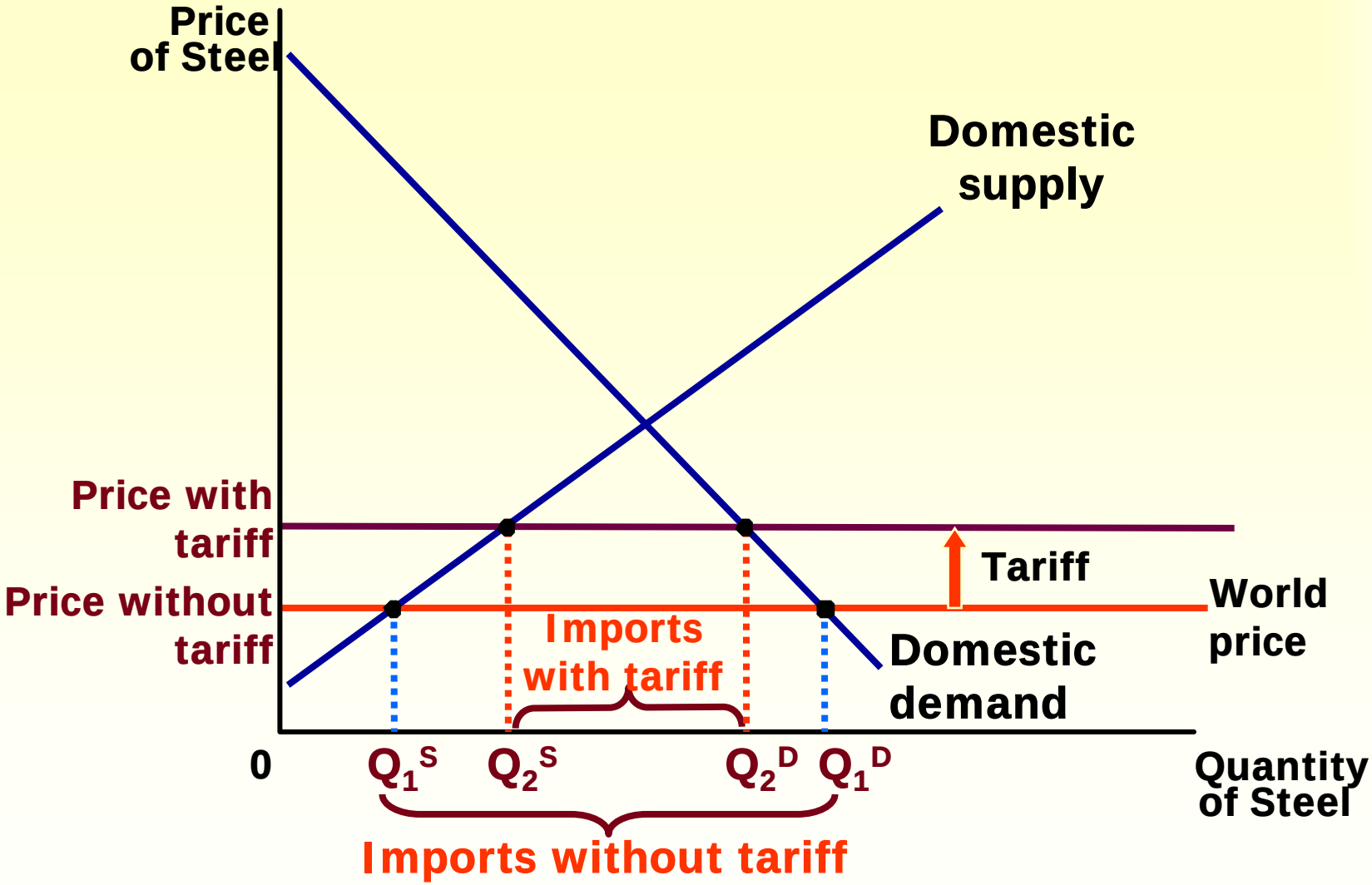
The Effects of a Tariff...



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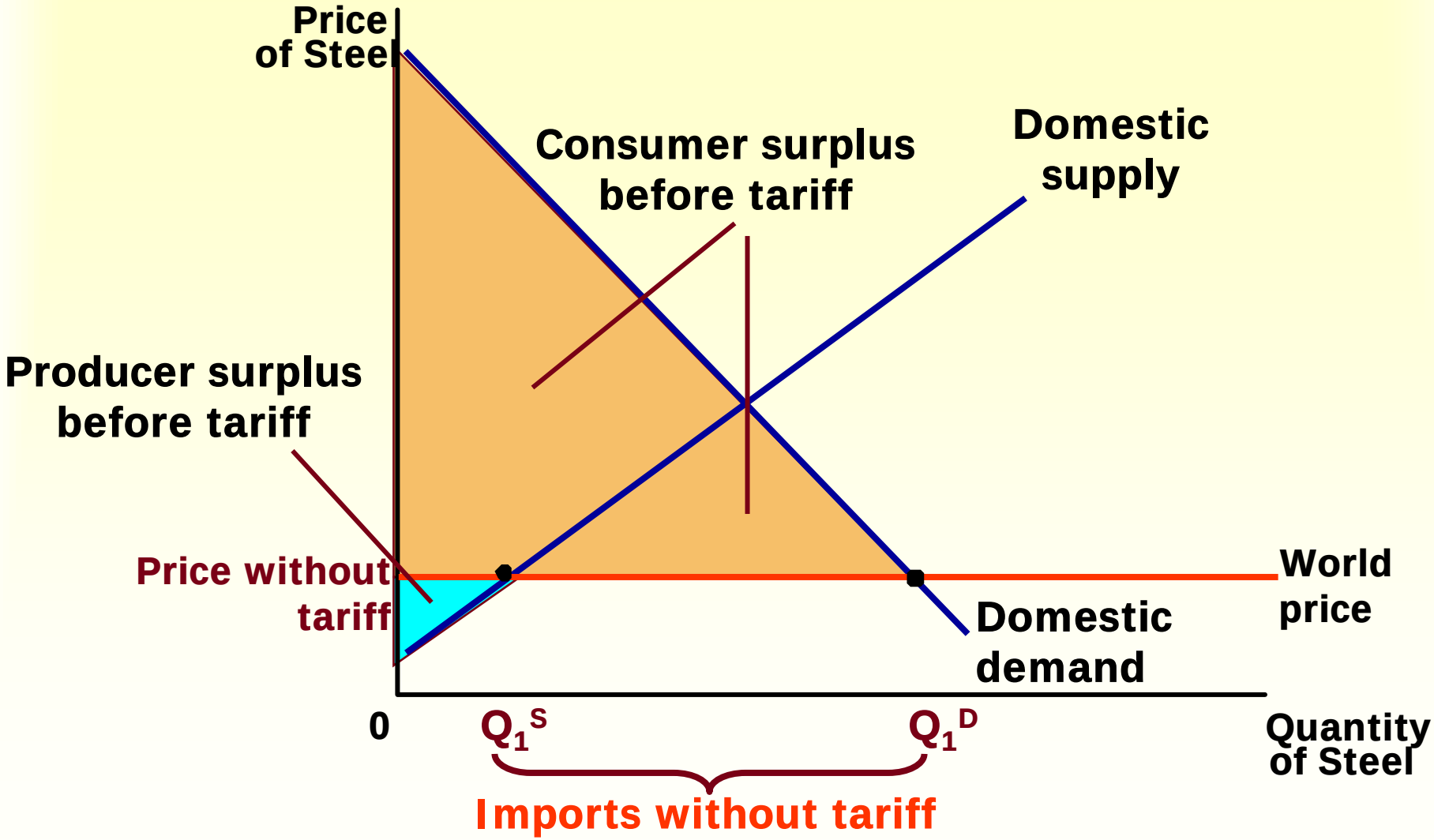

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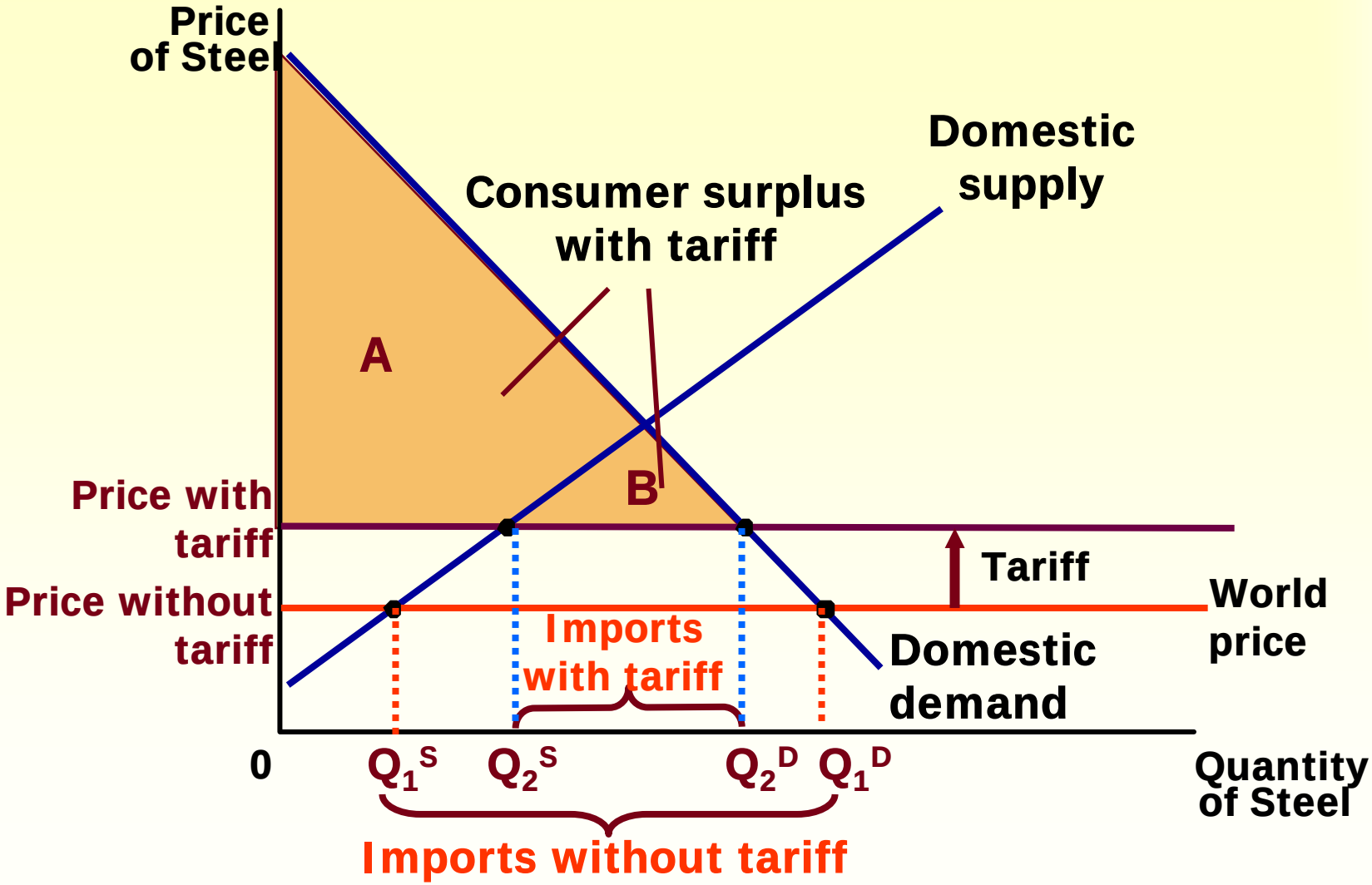

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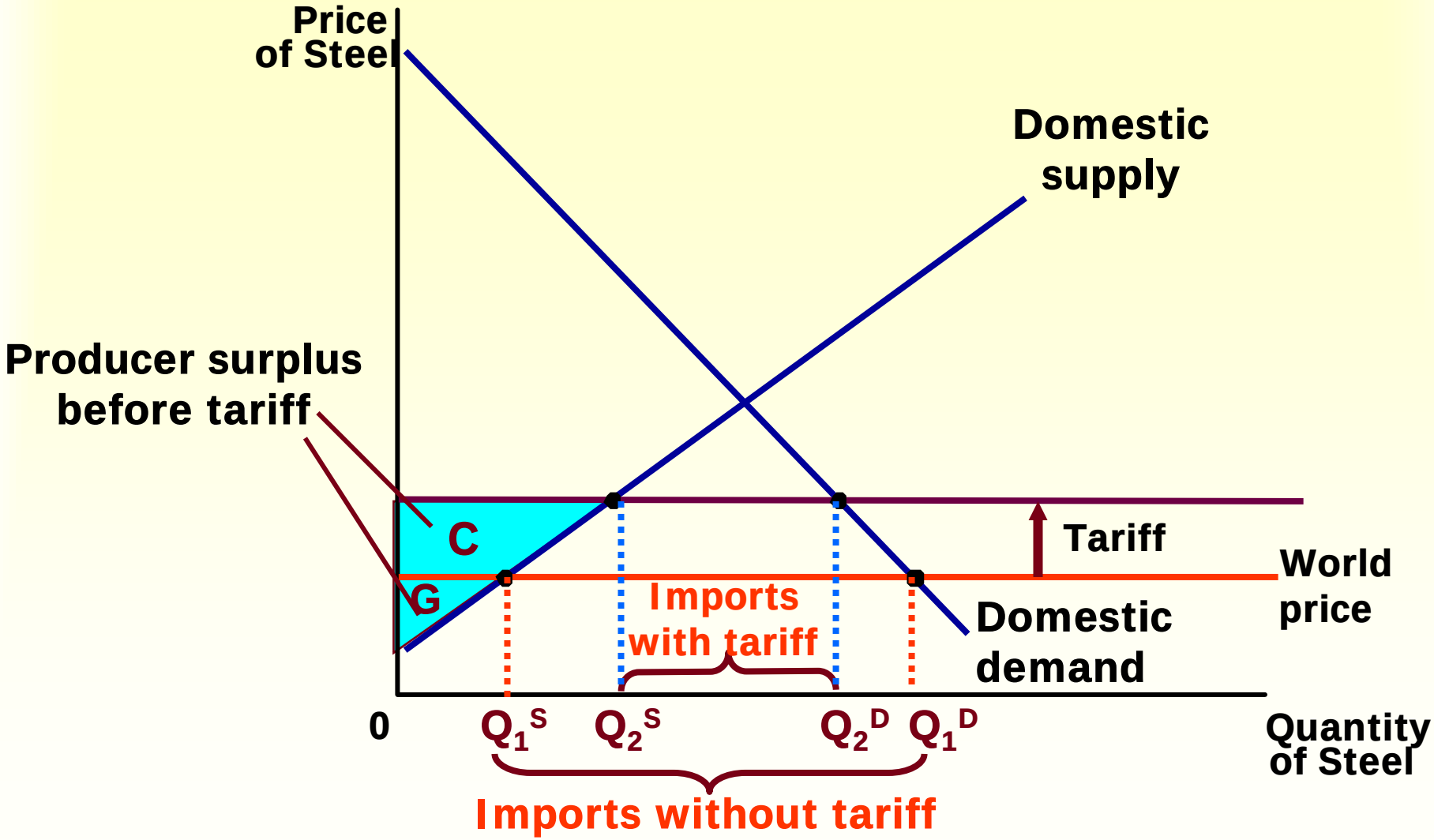

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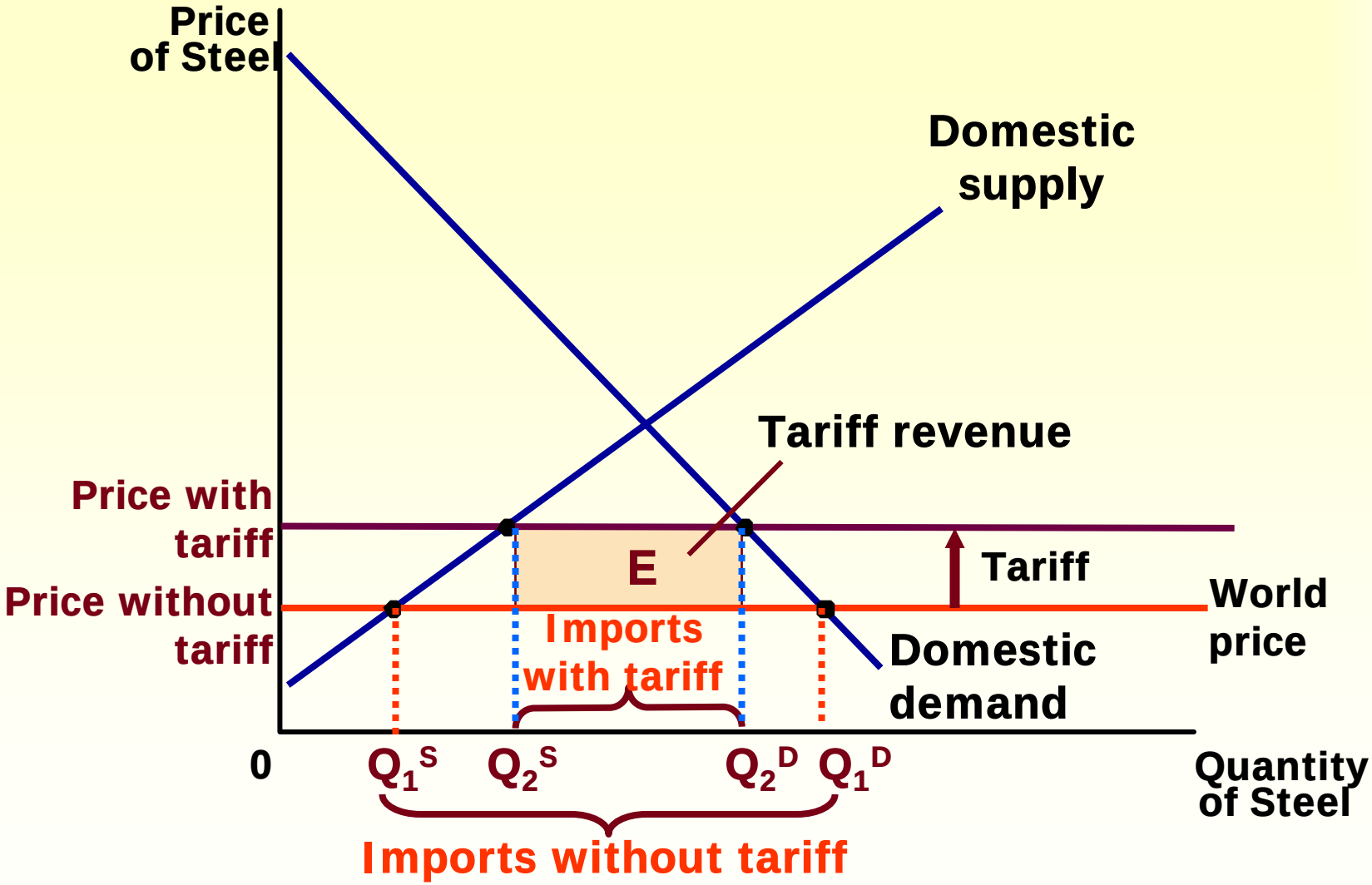

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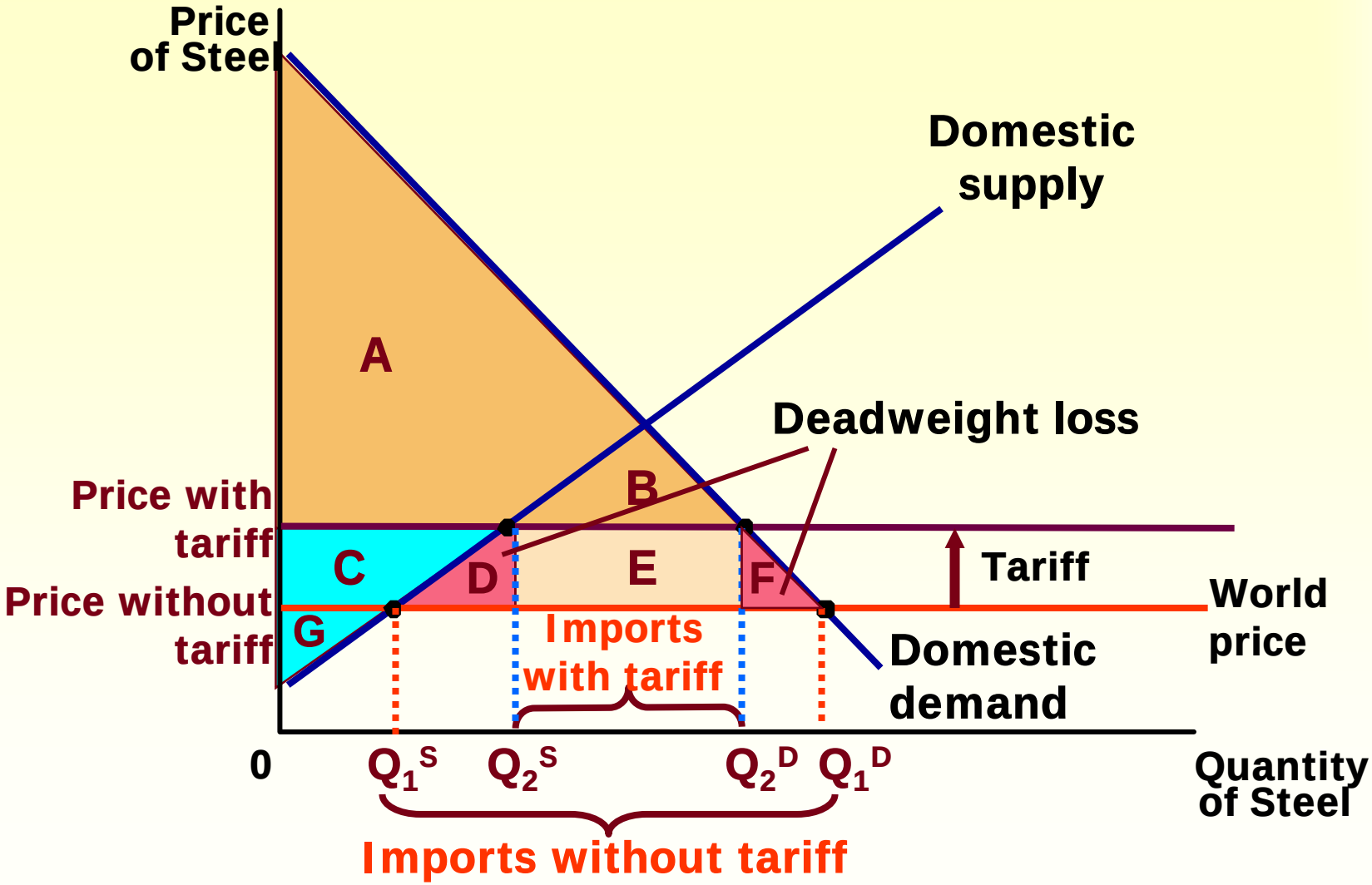

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Changes in Welfare from a Tariff

	Before Tariff	After Tariff	Change
Consumer Surplus	A+B+C+D+E+F	A + B	- (C+D+E+F)
Producer Surplus	G	C + G	+ C
Government Revenue	None	E	+ E
Total Surplus	A+B+C+D+E+F+G	A+B+ C+ E+ G	- (D + F)

The area D+F shows the fall in total surplus and represents the **deadweight loss** of the tariff.

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The Effects of a Tariff

- A tariff reduces the quantity of imports and moves the domestic market closer to its equilibrium without trade.
- With a tariff, total surplus in the market decreases by an amount referred to as a **deadweight loss.**

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The Effects of an Import Quota

An import quota is a limit on the quantity of imports.

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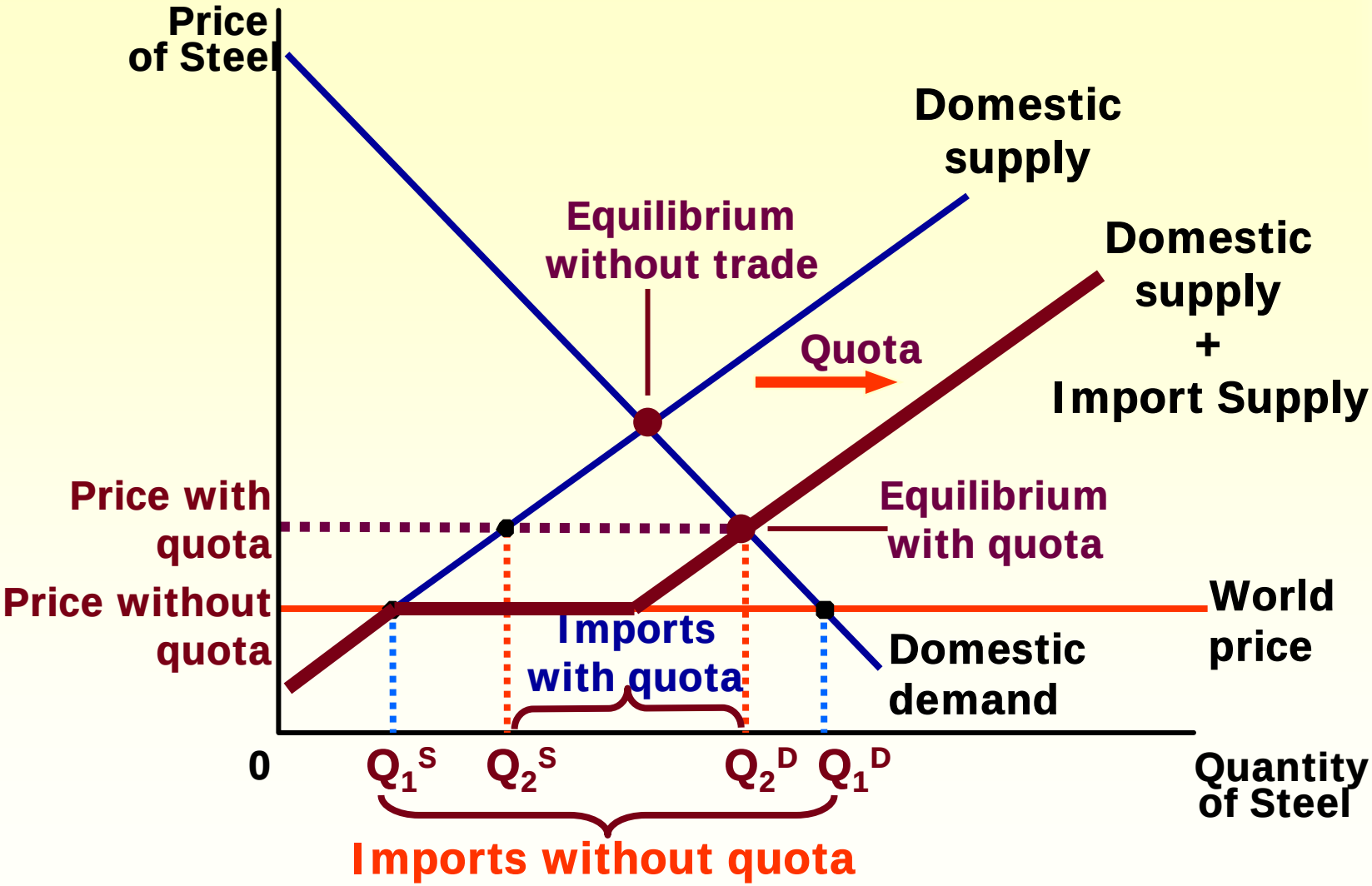
The Effects of an Import Quota ...



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The Effects of an Import Quota

- Because the quota raises the domestic price above the world price, domestic buyers of the good are worse off, and domestic sellers of the good are better off.
- License holders are better off because they make a profit from buying at the world price and selling at the higher domestic price.

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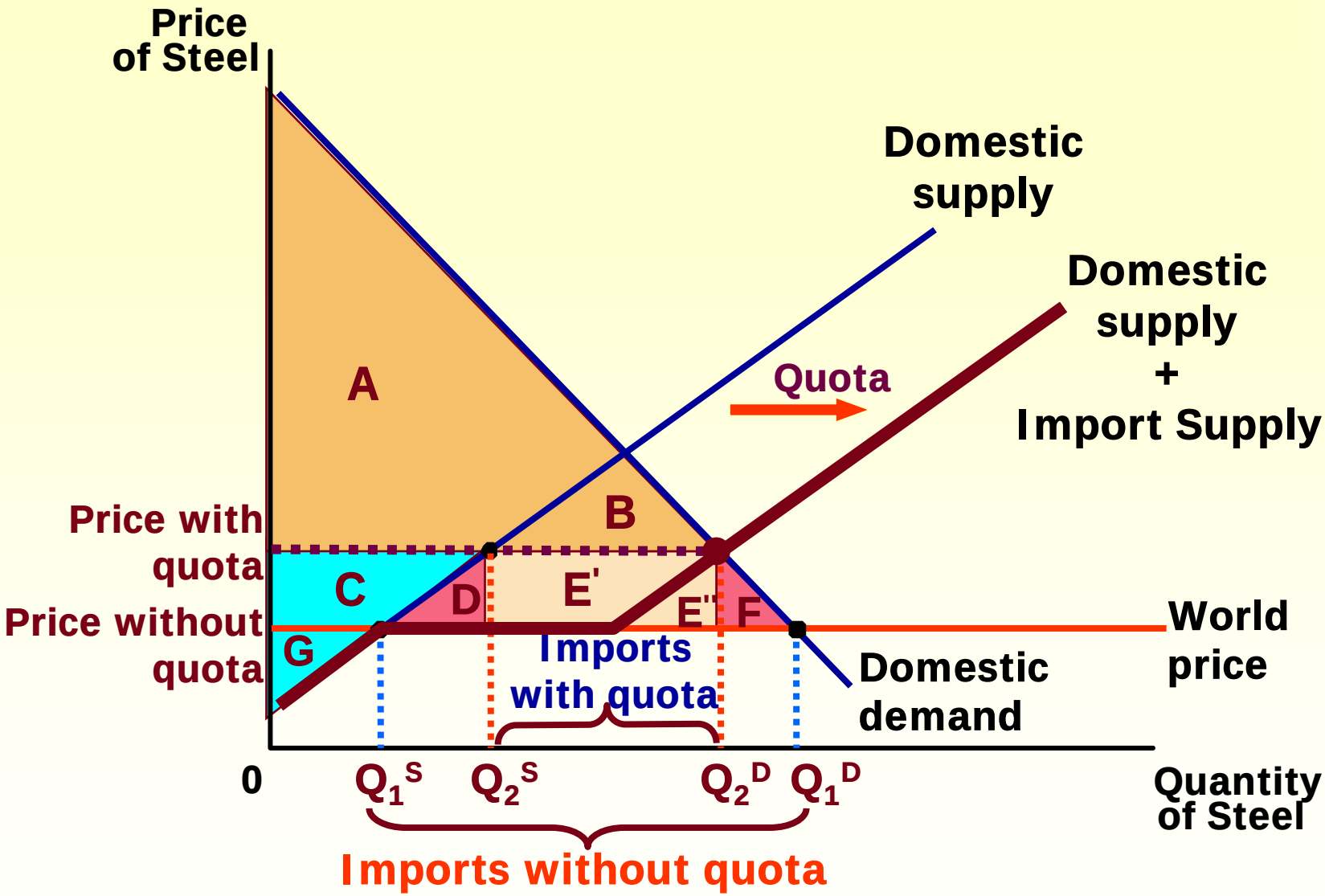
The Effects of an Import Quota ...



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Changes in Welfare from an Import Quota

	Before Quota	After Tariff	Change
Consumer Surplus	A+B+C+D+E'+E"+F	A+B	-(C+D+E'+E"+F)
Producer Surplus	G	C+G	+C
Government Revenue	None	E'+E"	+(E'+E")
Total Surplus	A+B+C+D+E'+E"+F+G	A+B+C+E'+E"+G	- (D+F)

The area D+F shows the fall in total surplus and represents the **deadweight loss** of the quota.

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The Effects of an Import Quota

- With a quota, total surplus in the market decreases by an amount referred to as a **deadweight loss.**
- The quota can potentially cause an even larger deadweight loss, if a mechanism such as lobbying is employed to allocate the import licenses.

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The Effects of Tariffs and Quotas

If government sells import licenses for full value, revenue equals that of equivalent tariff and the results of tariffs and quotas are identical.

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Both tariffs and import quotas . . .

- . . .raise domestic prices.
- . . .reduce the welfare of domestic consumers.
- . . .increase the welfare of domestic producers.
- . . .cause deadweight losses.

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Other Benefits of International Trade

- Increased variety of goods
- Lower costs through economies of scale
- Increased competition
- Enhanced flow of ideas

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The Arguments for Restricting Trade

- Jobs
- National Security
- Infant Industry
- Unfair Competition
- Protection as a Bargaining Chip

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Trade Agreements

- **Unilateral:** when a country removes its trade restrictions on its own.
- **Multilateral:** a country reduces its trade restrictions while other countries do the same.

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NAFTA

- **The North American Free Trade Agreement (NAFTA) is an example of a multilateral trade agreement.**
- **In 1993, NAFTA lowered the trade barriers among the U.S., Mexico, and Canada.**

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GATT

- **The General Agreement on Tariffs and Trade (GATT) refers to a continuing series of negotiations among many of the world's countries with a goal of promoting free trade.**
- **GATT has successfully reduced the average tariff among member countries from about 40% after WWII to about 5% today.**

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Summary

- The effects of free trade can be determined by comparing the domestic price without trade to the world price.
- A low domestic price indicates that the country has a comparative advantage in producing the good and that the country will become an exporter.
- A high domestic price indicates that the rest of the world has a comparative advantage in producing the good and that the country will become an importer.

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Summary

- When a country allows trade and becomes an exporter of a good, producers of the good are better off, and consumers of the good are worse off.
- When a country allows trade and becomes an importer of a good, consumers of the good are better off, and producers are worse off.

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Summary

- A tariff – a tax on imports – moves a market closer to the equilibrium than would exist without trade, and therefore reduces the gains from trade.
- Import quotas will have effects similar to those of tariffs.

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Summary

- There are various arguments for restricting trade: protecting jobs, defending national security, helping infant industries, preventing unfair competition, and responding to foreign trade restrictions.
- Economists, however, believe that free trade is usually the better policy.

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Graphical Review

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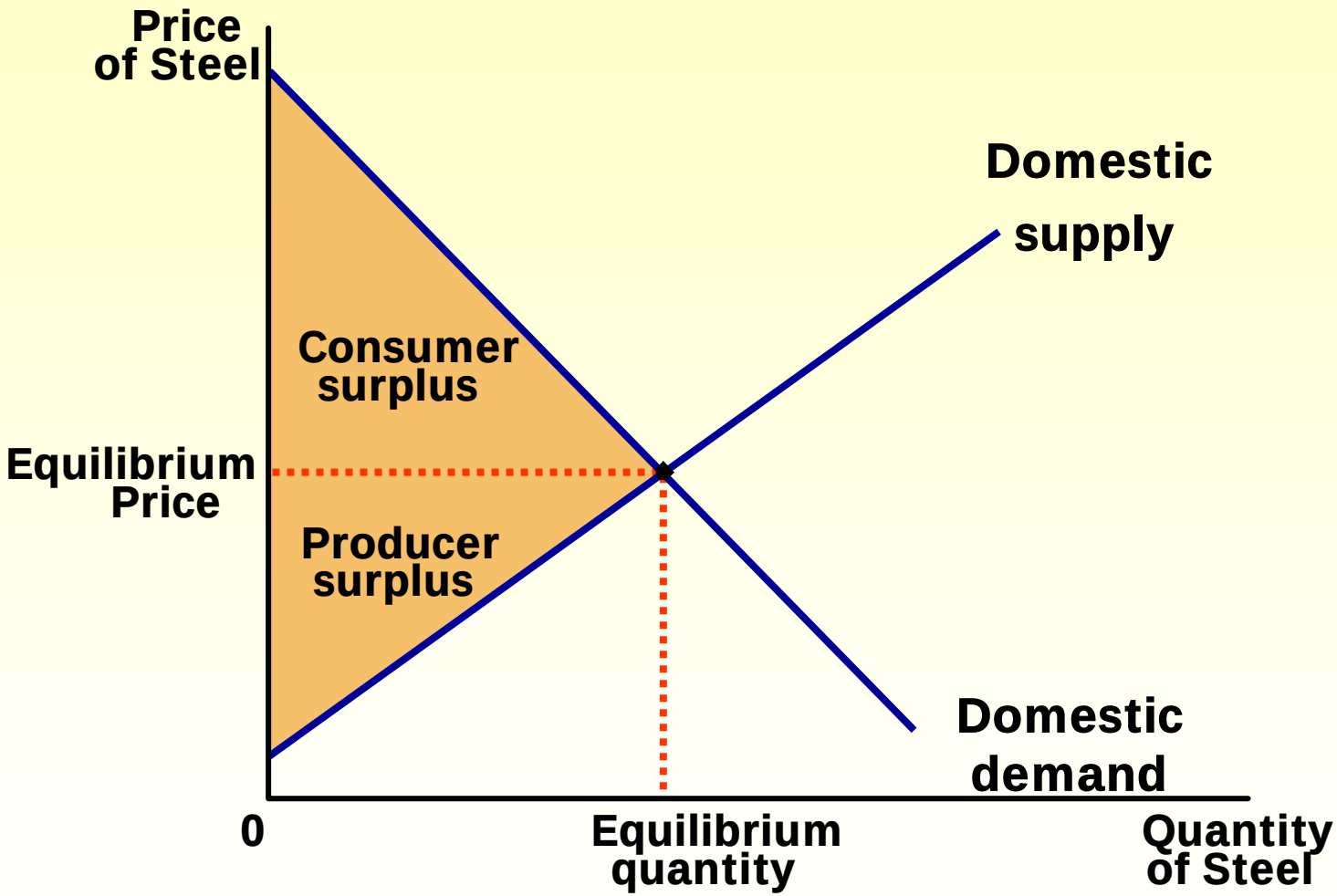
Equilibrium Without Trade...



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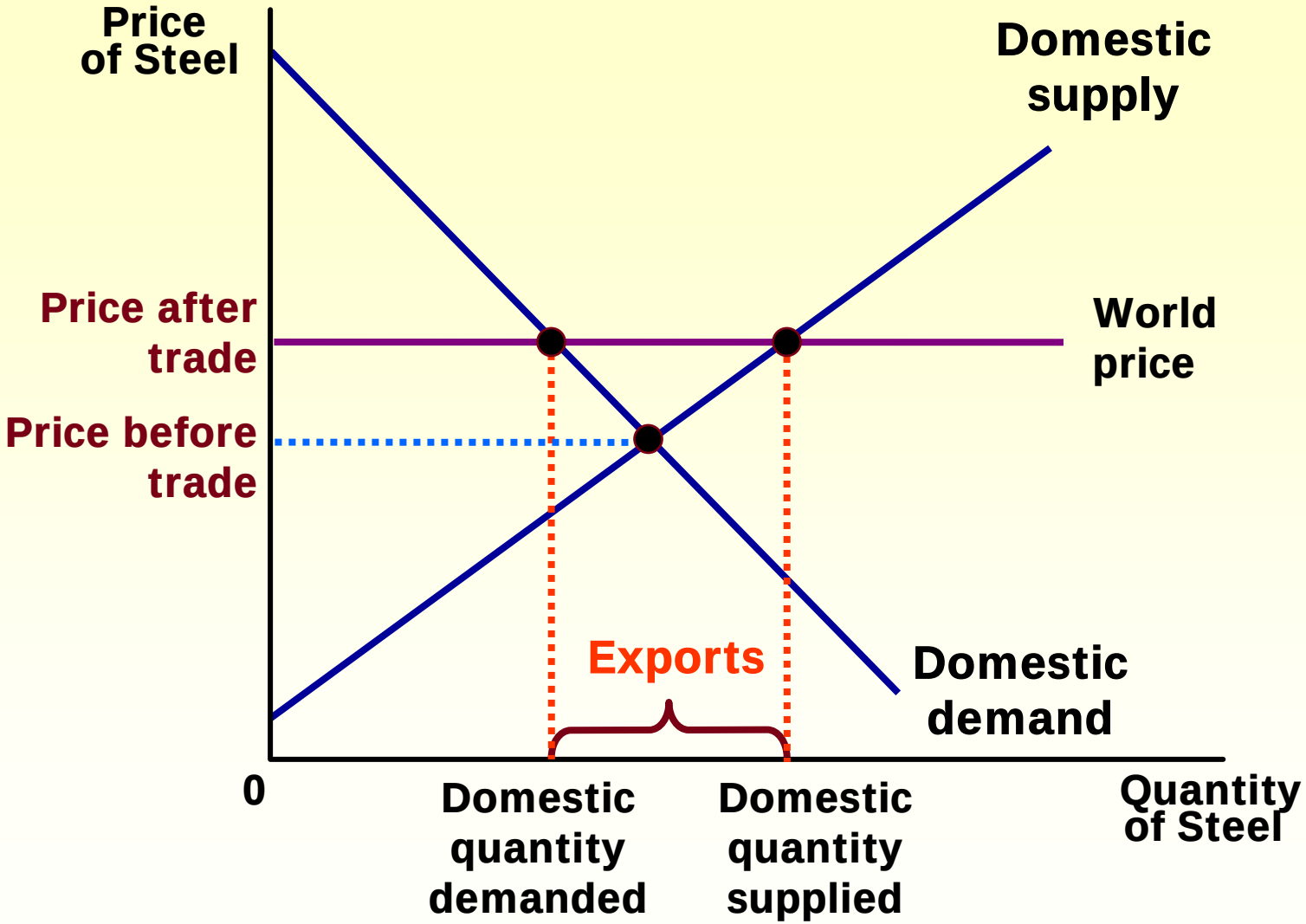
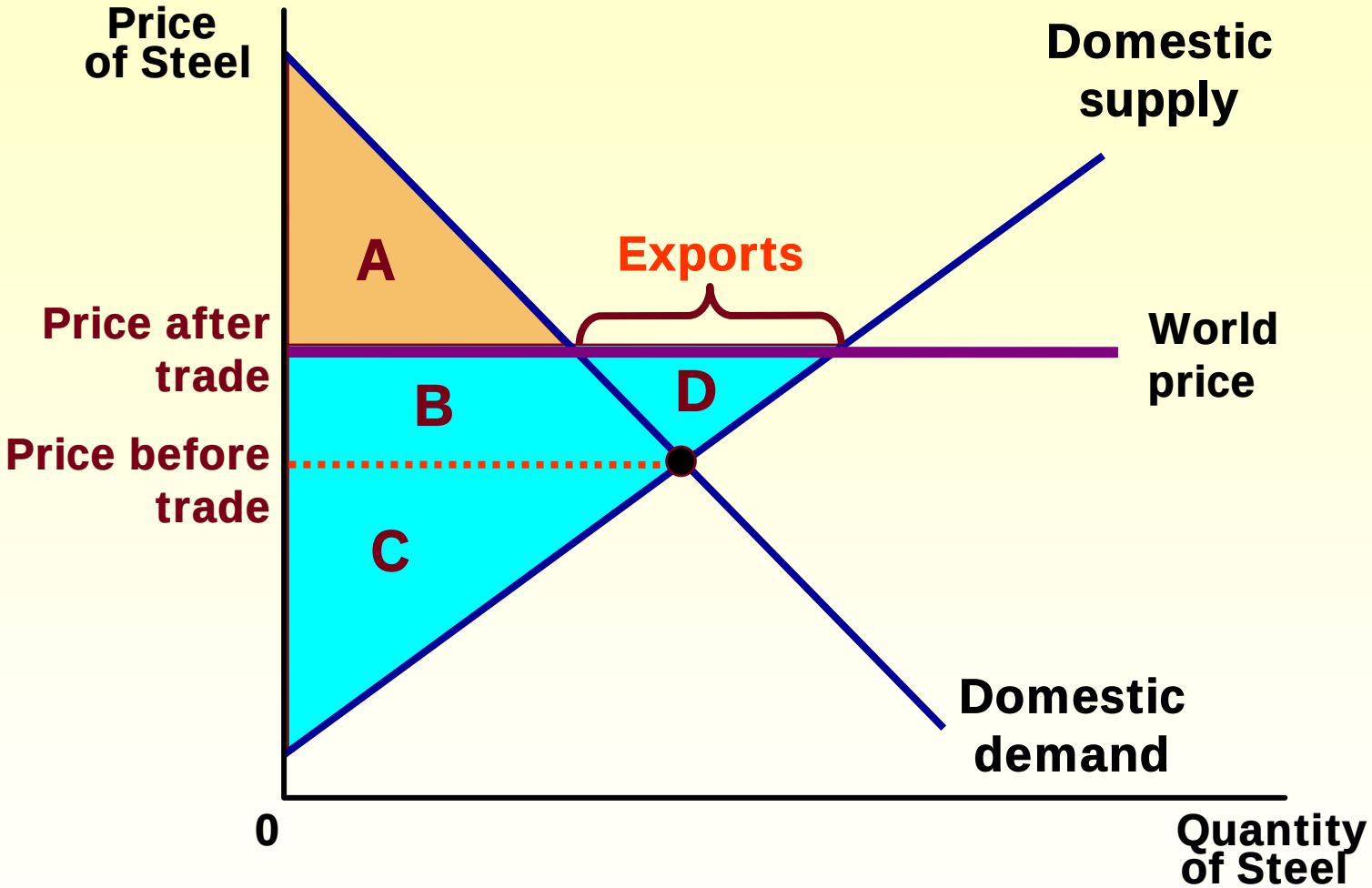


How Free Trade Affects Welfare in an Exporting Country...



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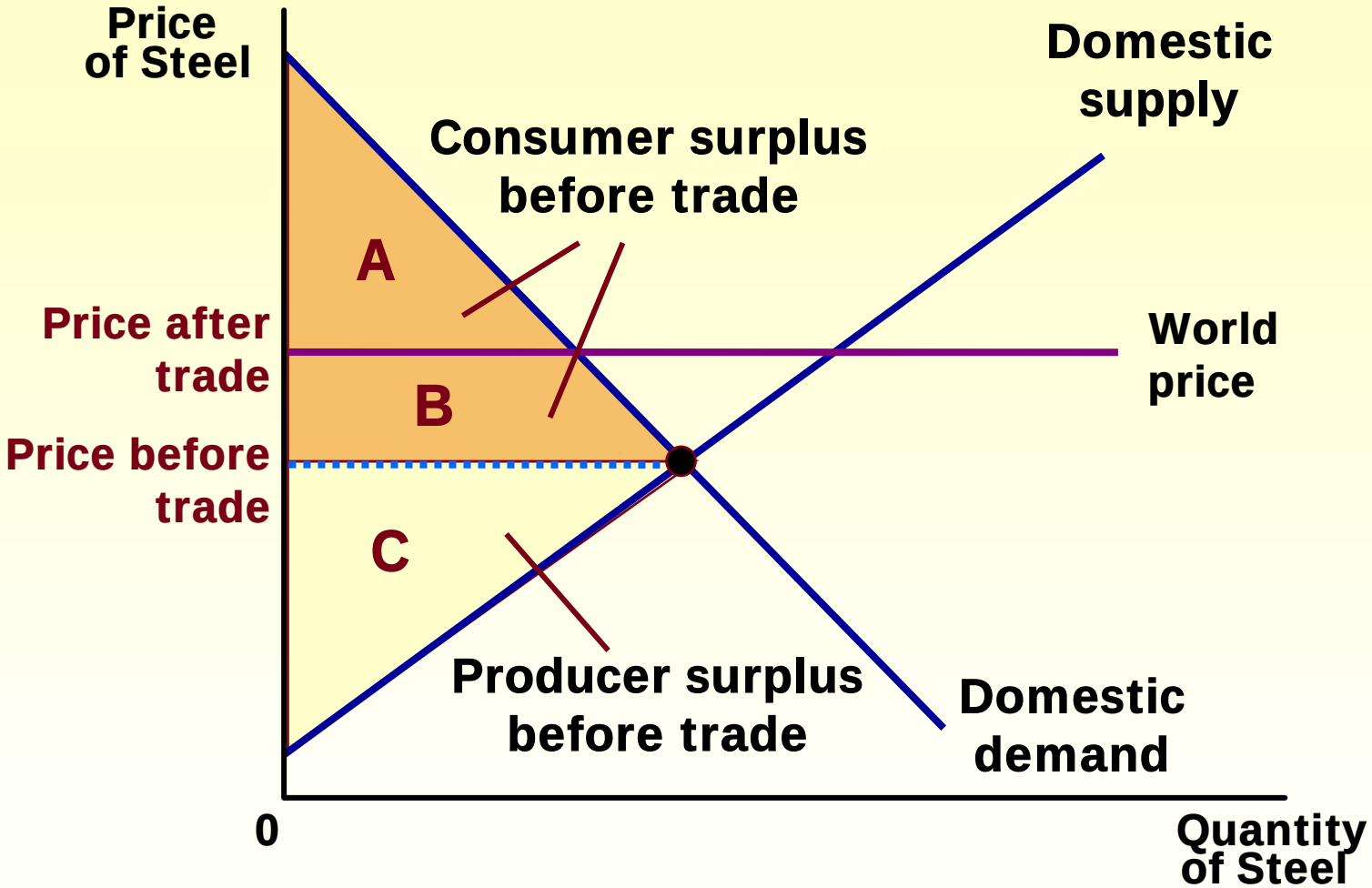

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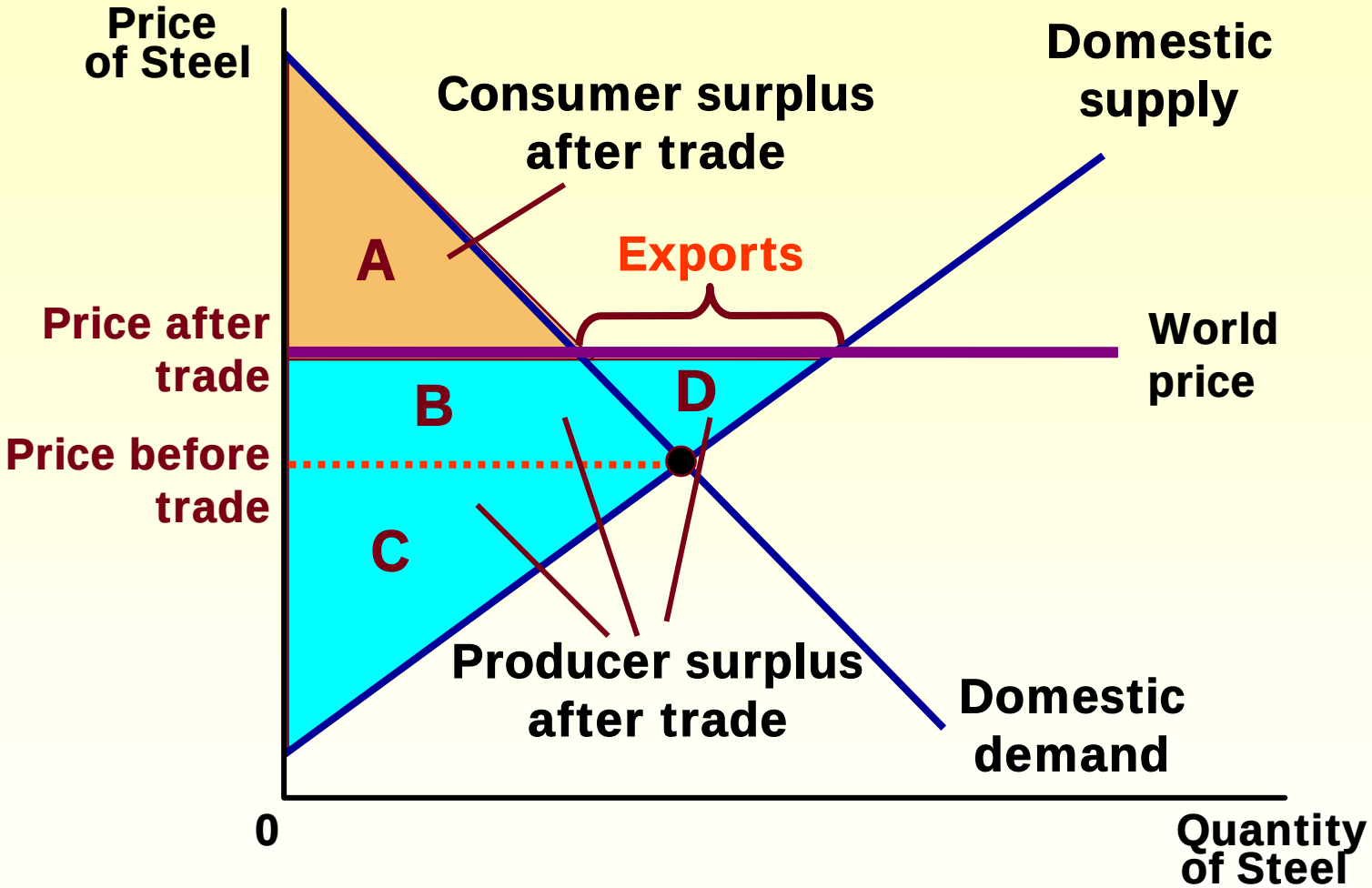

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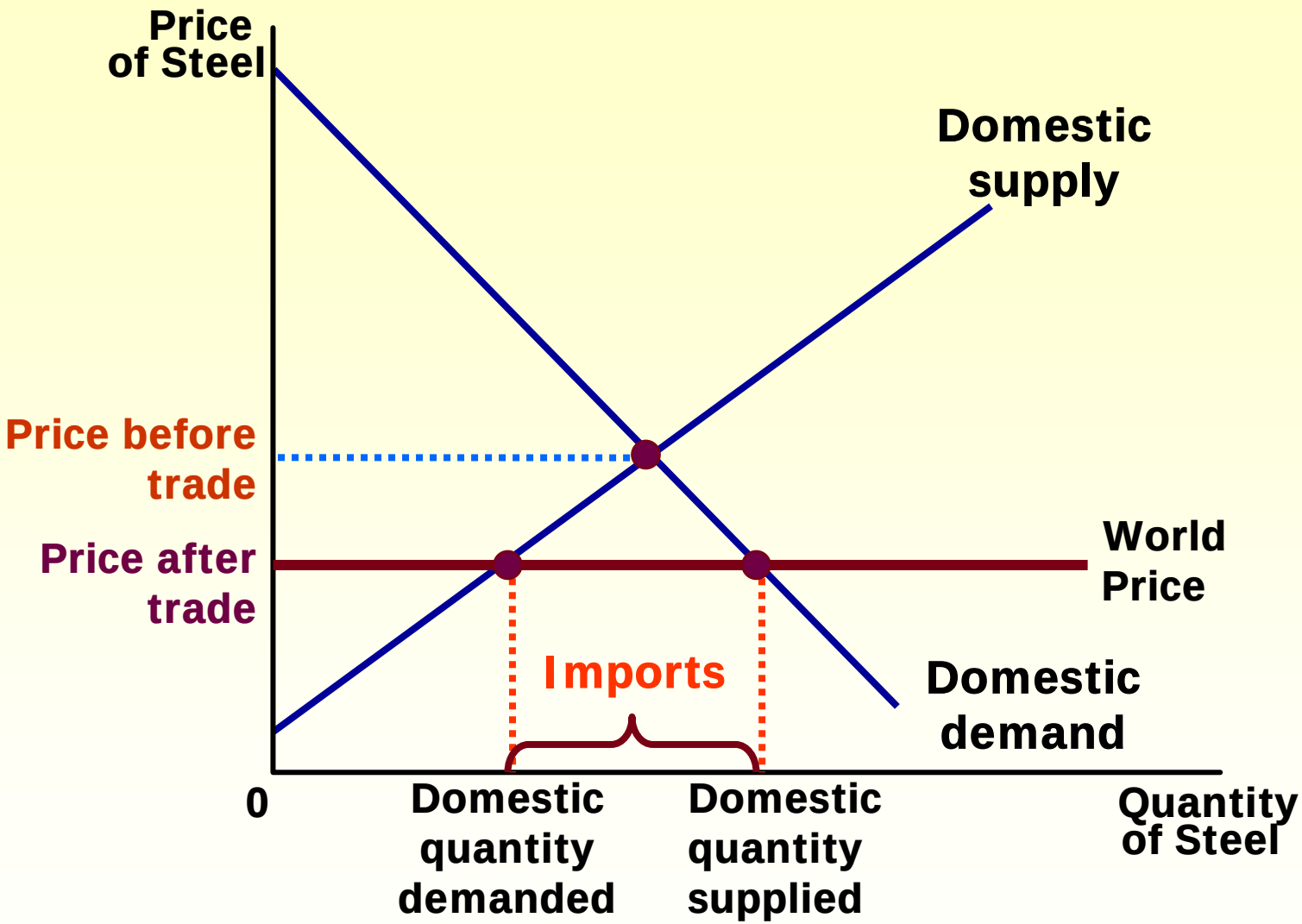
International Trade and the Importing Country...



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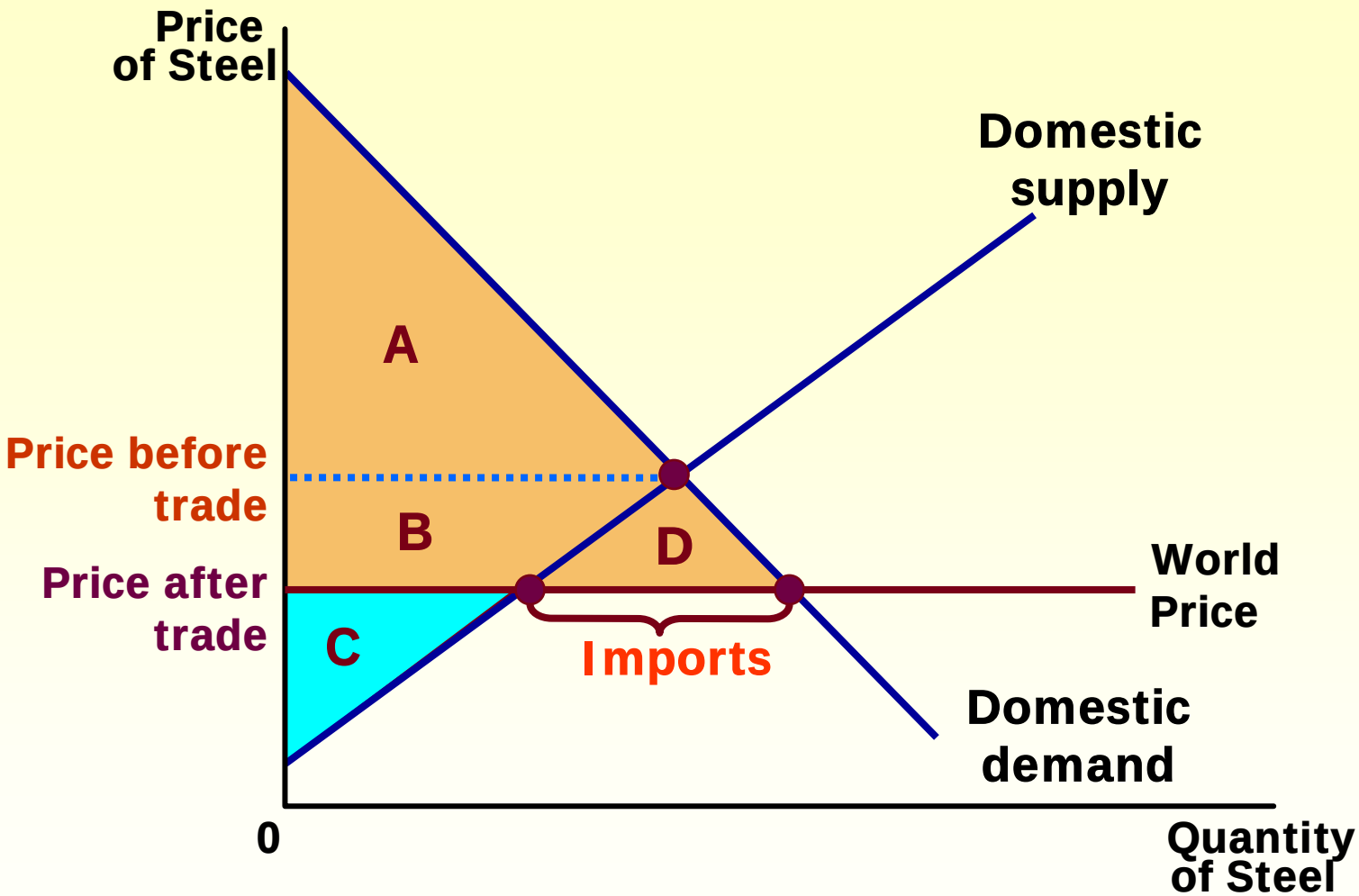

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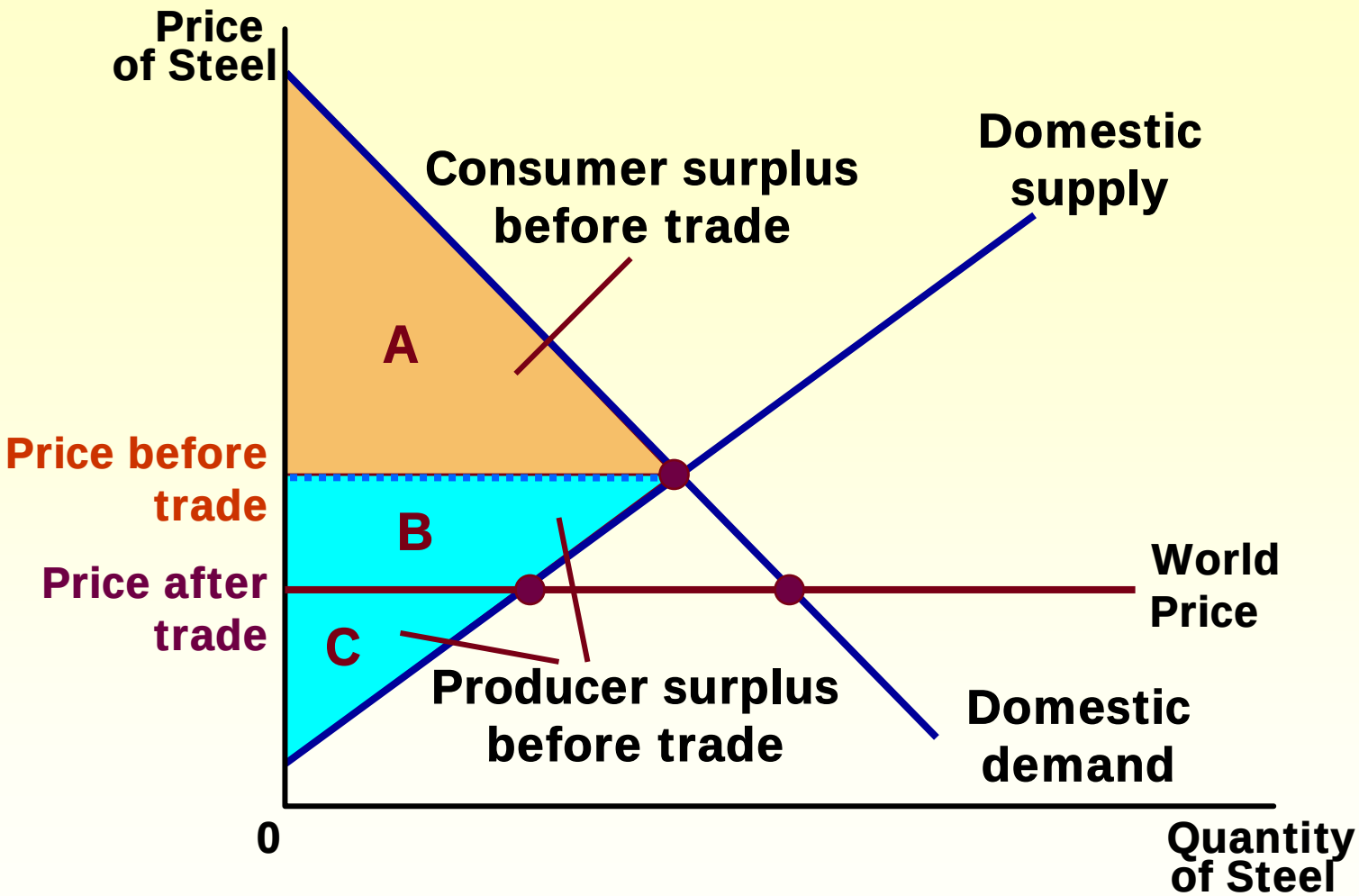

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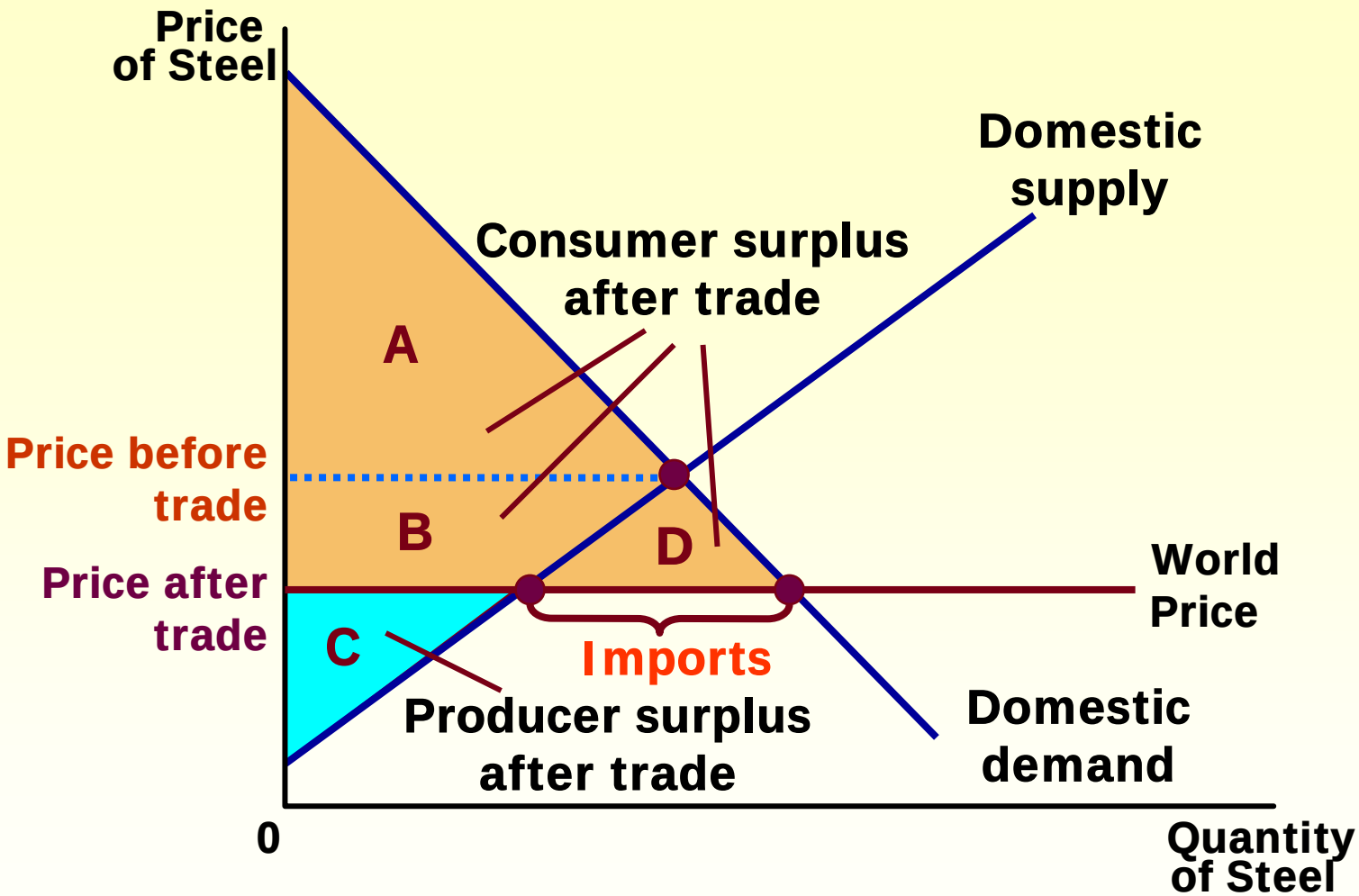

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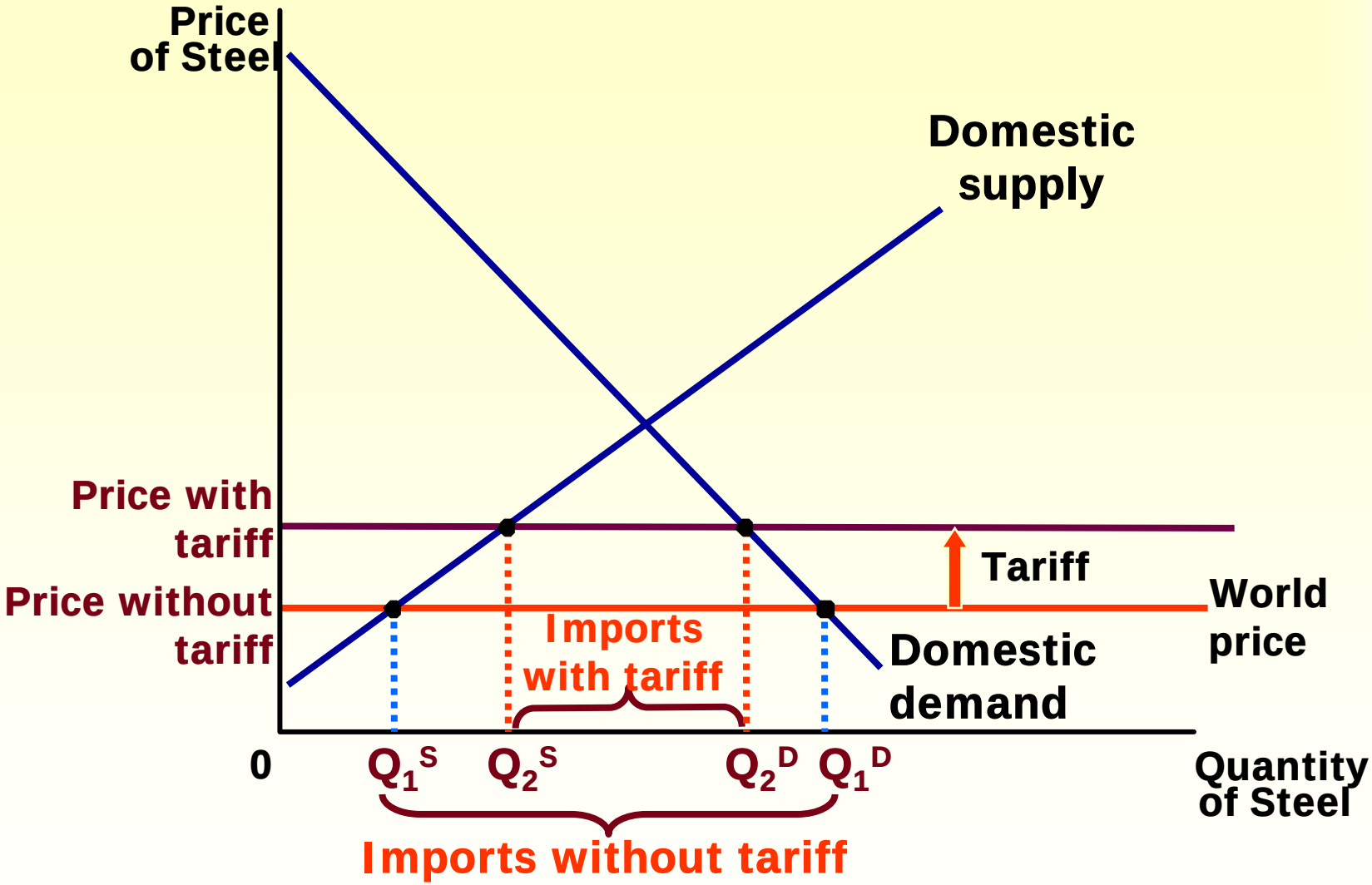

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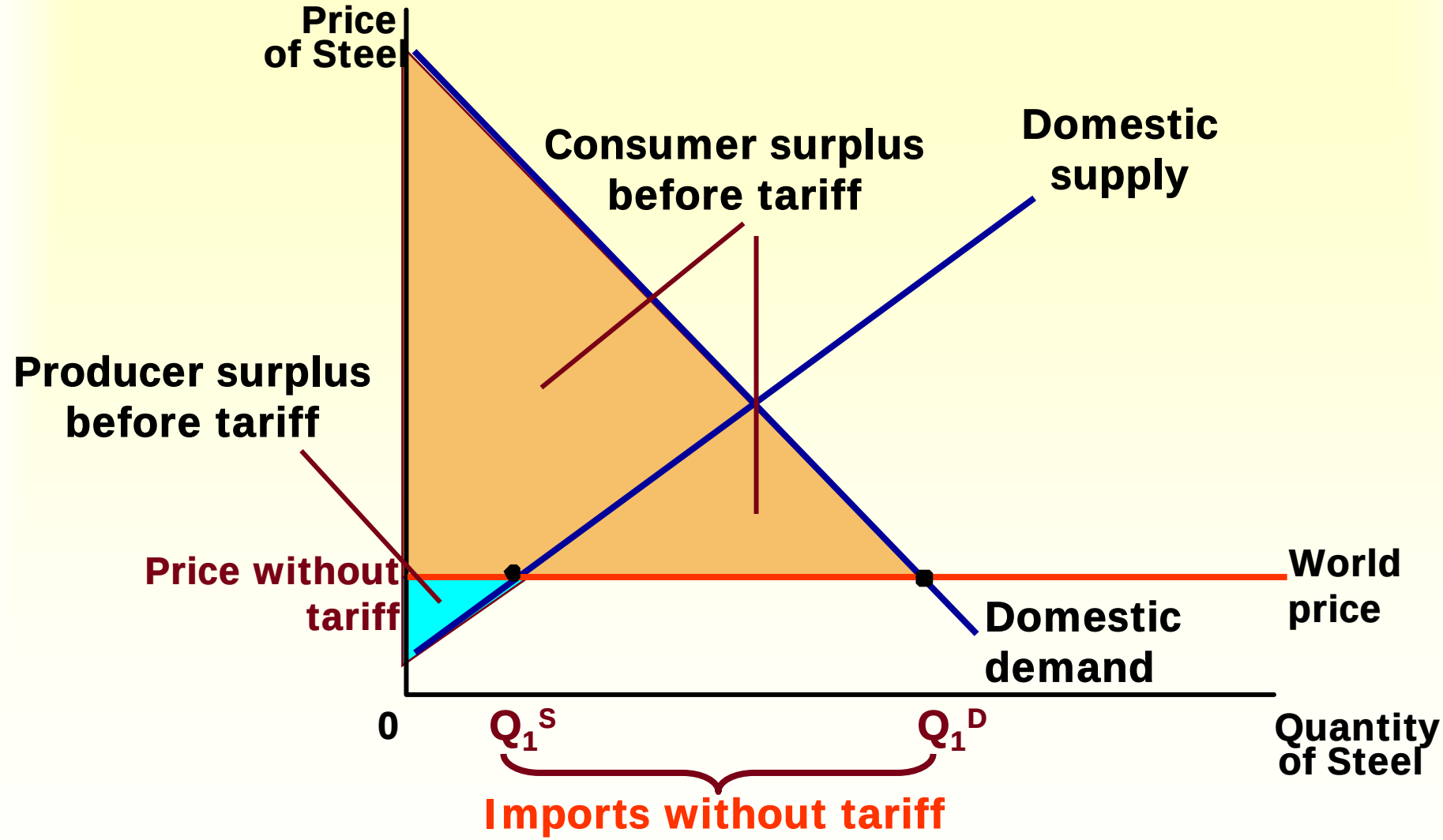

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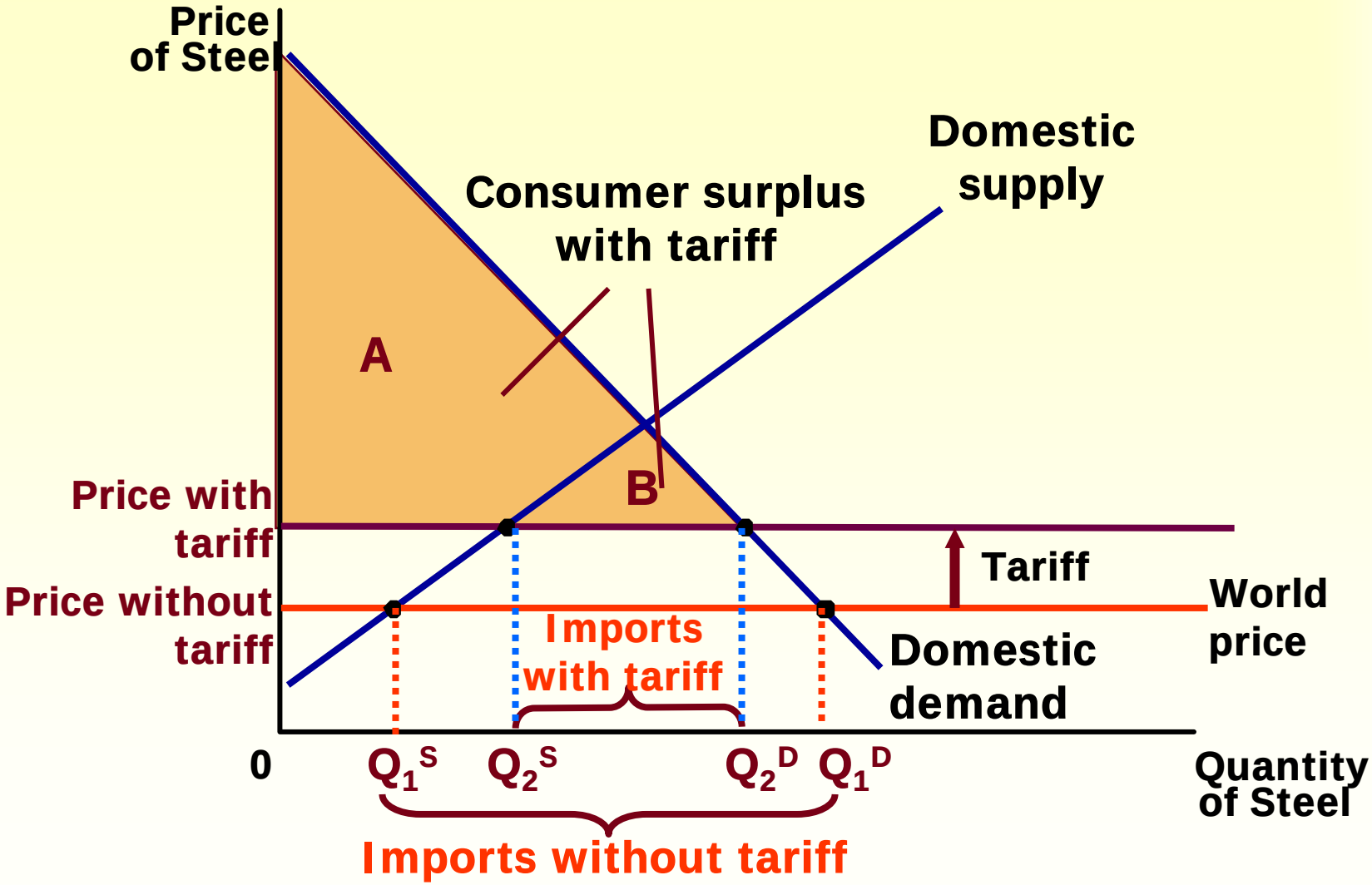

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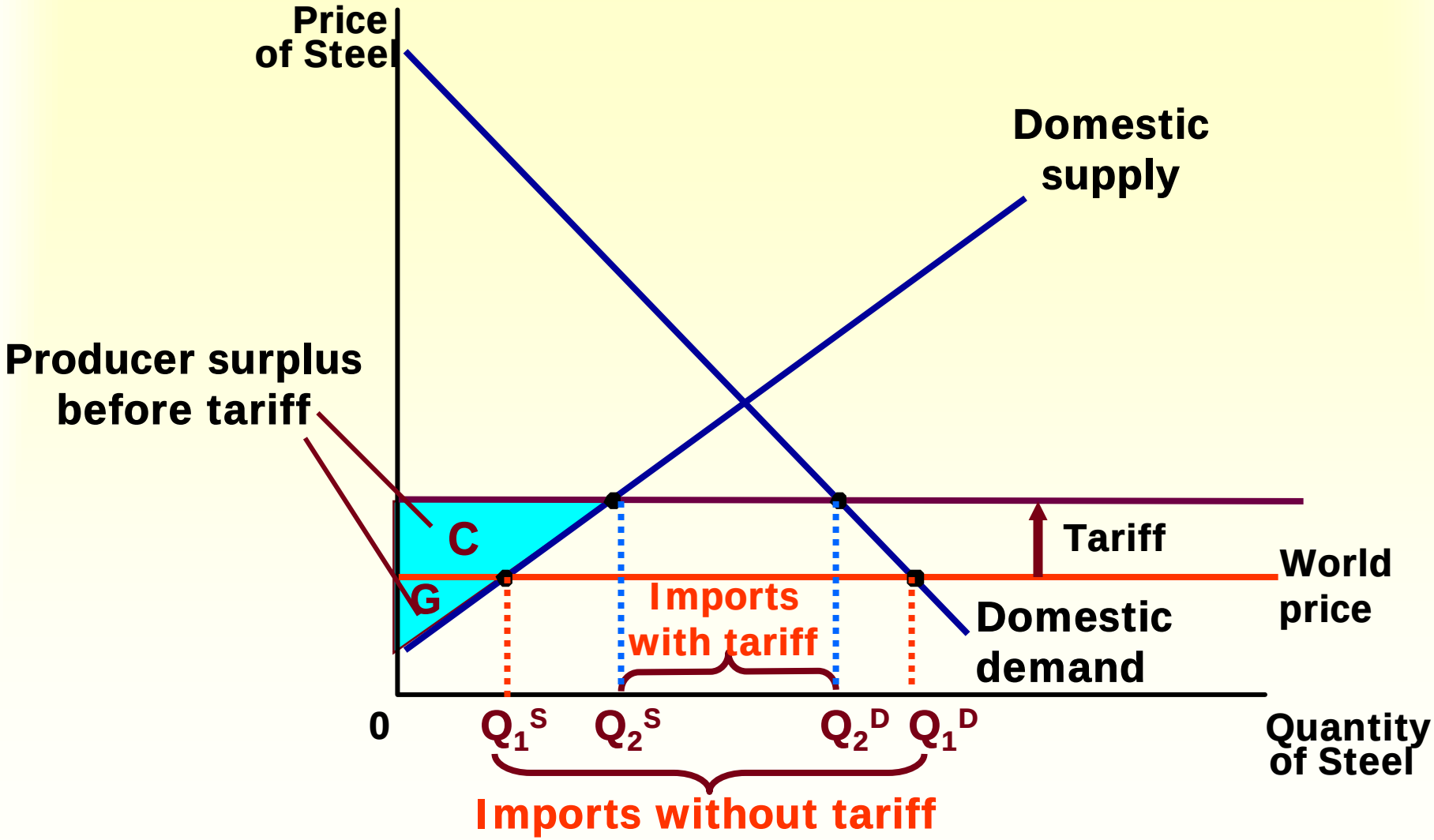

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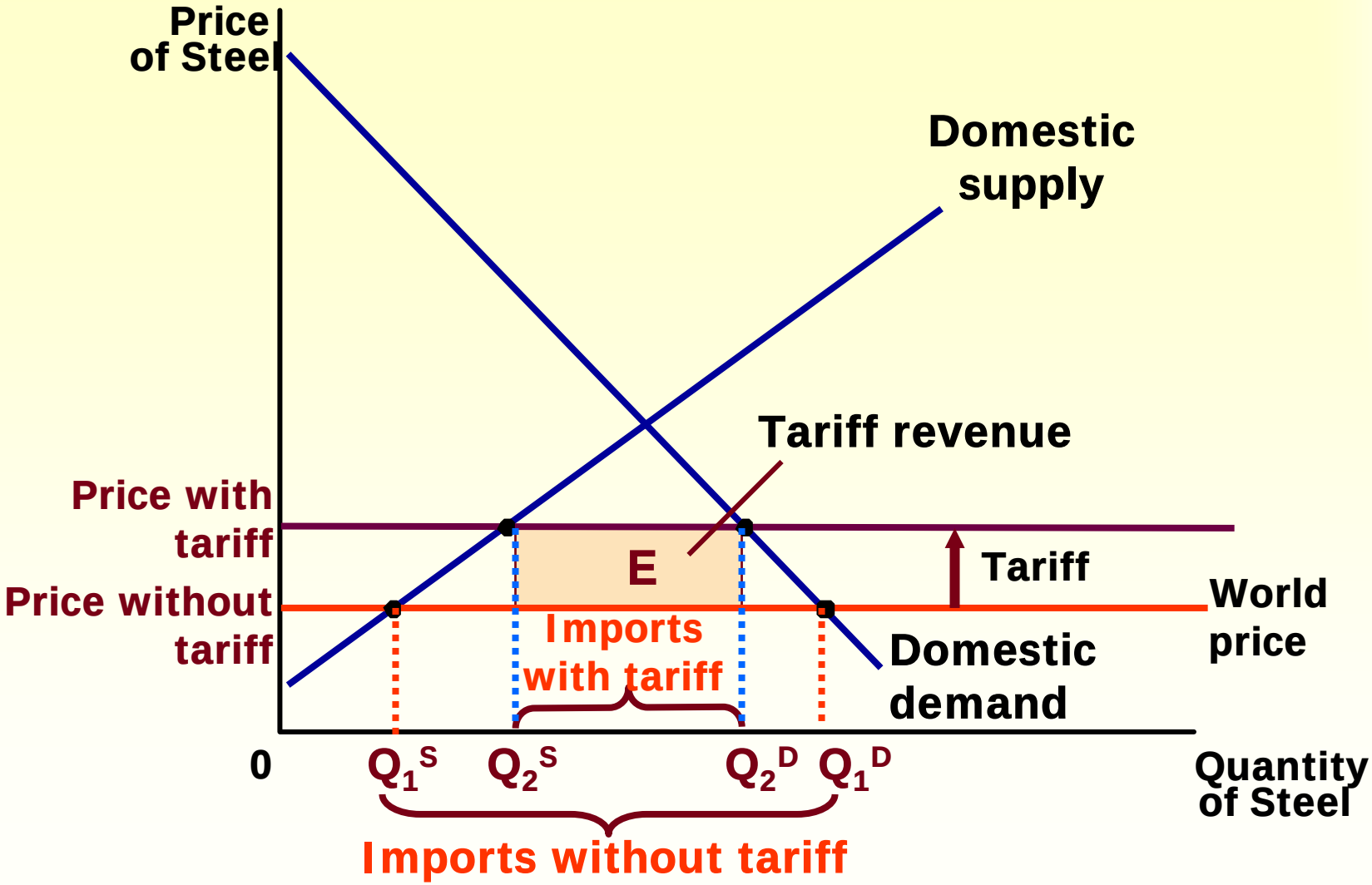

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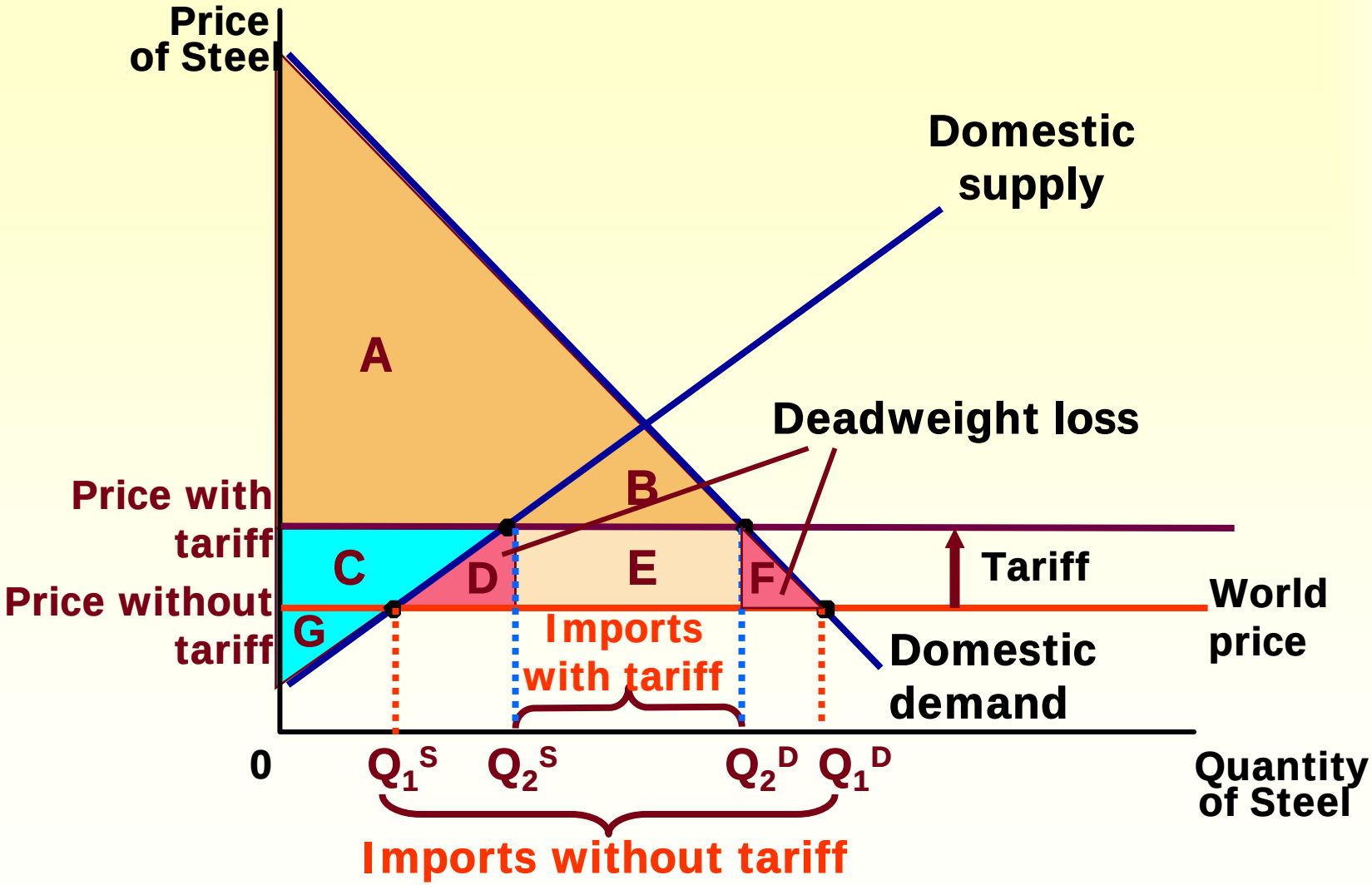

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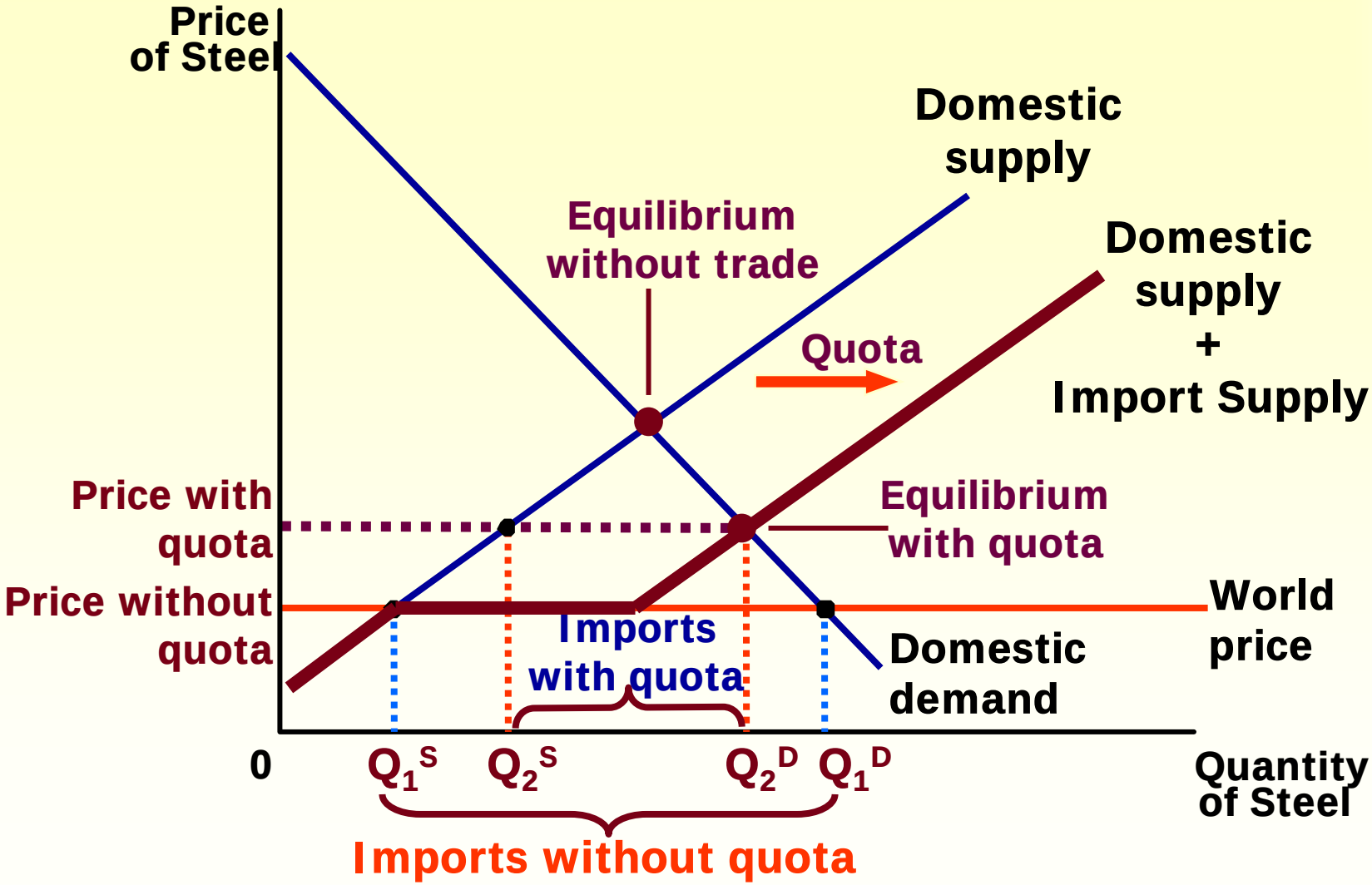

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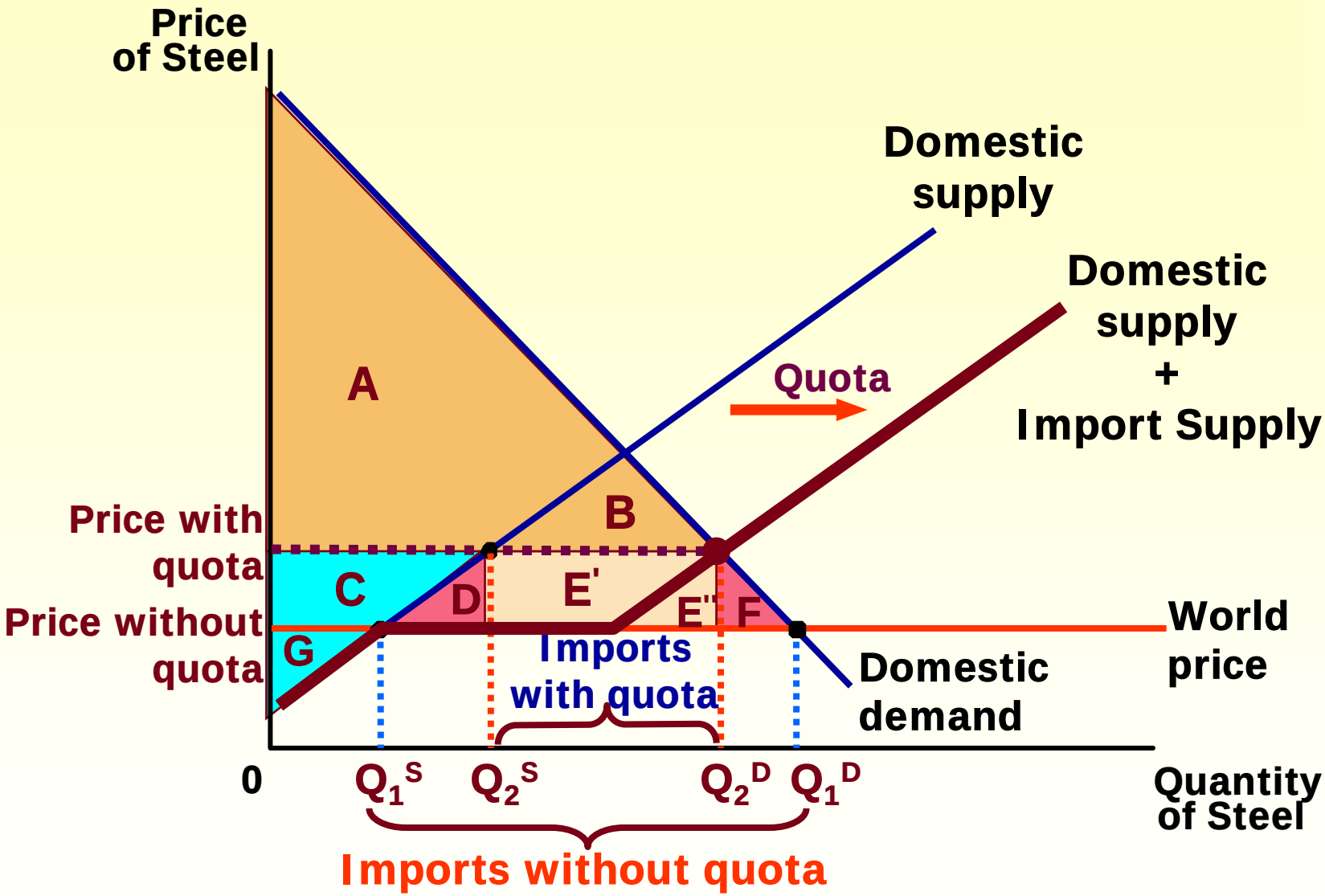

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Externalities

Chapter 10

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Market Efficiency - Market Failures

Recall that: Adam Smith's "invisible hand" of the marketplace leads self-interested buyers and sellers in a market to maximize the total benefit that society can derive from a market.

But market failures can still happen.

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Market Failures: Externalities

- When a market outcome affects parties other than the buyers and sellers in the market, side-effects are created called **externalities.**
- Externalities cause markets to be inefficient, and thus fail to maximize total surplus.

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An externality arises...

. . . when a person engages in an activity that influences the well-being of a bystander and yet neither pays nor receives any compensation for that effect.

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Market Failures: Externalities

- When the impact on the bystander is adverse, the externality is called a **negative externality**.
- When the impact on the bystander is beneficial, the externality is called a **positive externality**.

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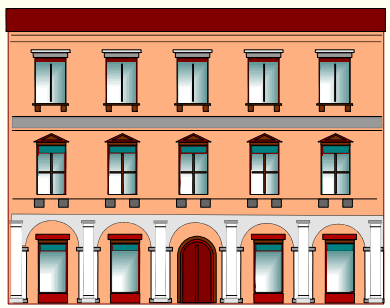
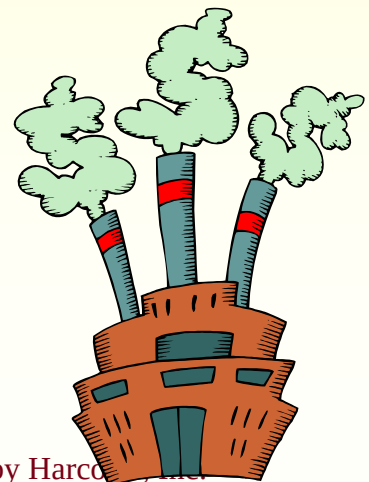
Examples of Negative Externalities

- Automobile exhaust
- Cigarette smoking
- Barking dogs (loud pets)
- Loud stereos in an apartment building





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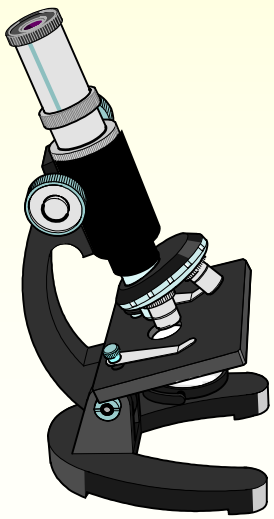
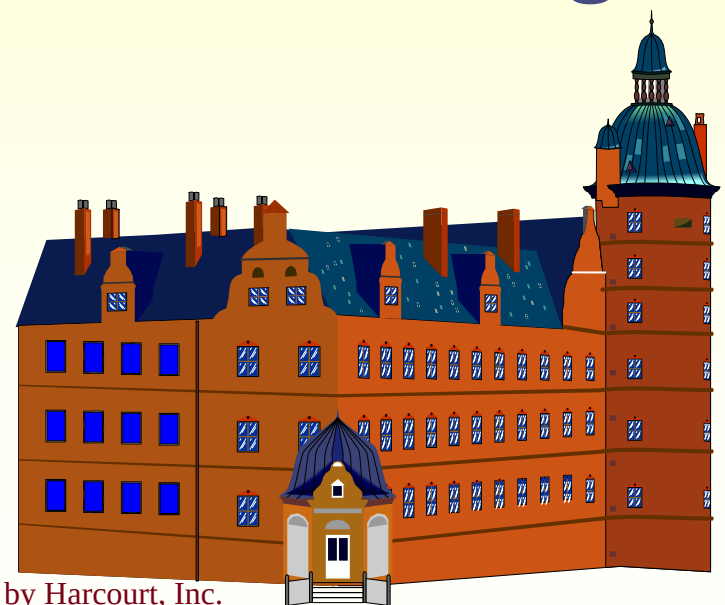
Examples of Positive Externalities

- Immunizations
- Restored historic buildings
- Research into new technologies





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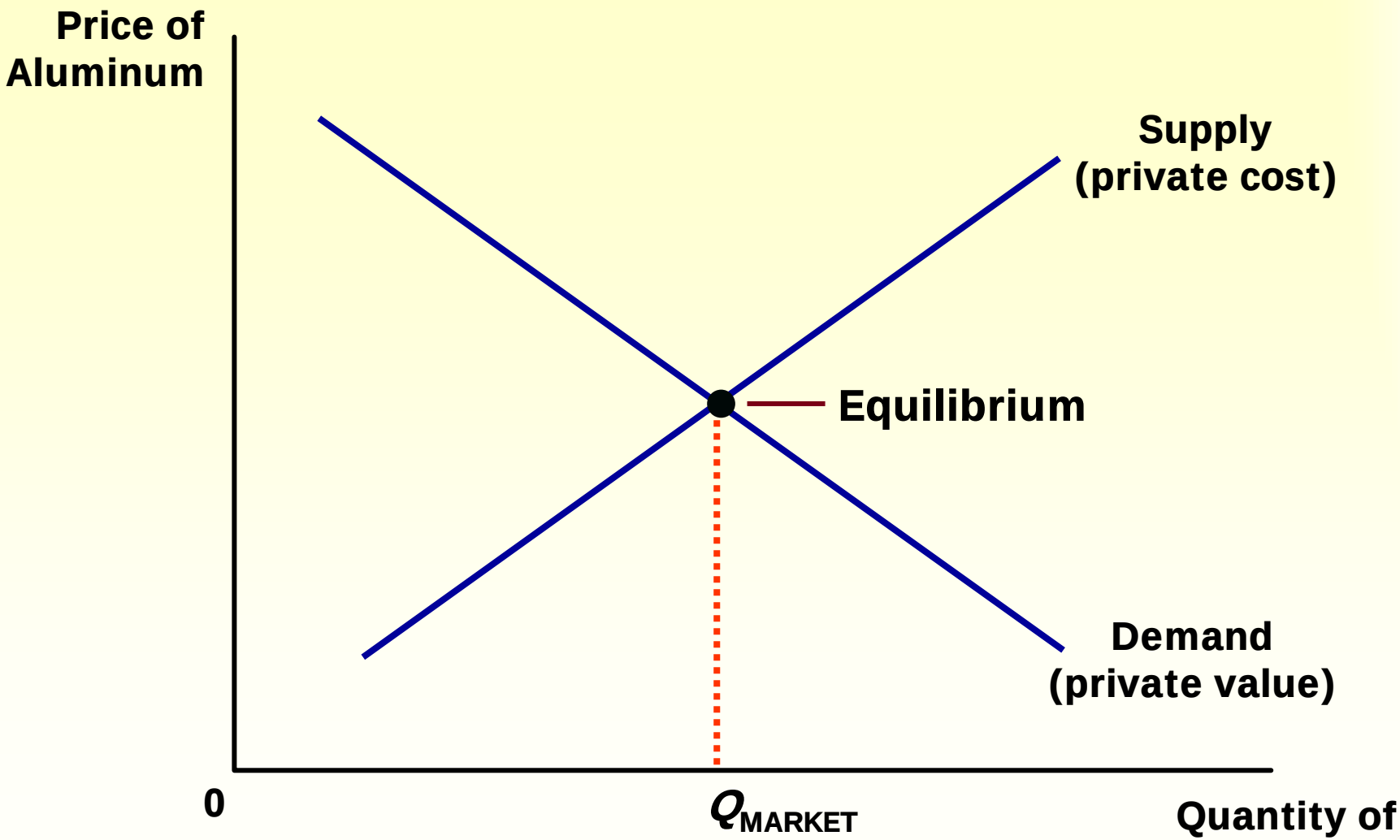
The Market for Aluminum...



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The Market for Aluminum and Welfare Economics

The quantity produced and consumed in the market equilibrium is efficient in the sense that it maximizes the sum of producer and consumer surplus.

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The Market for Aluminum and Welfare Economics

If the aluminum factories emit pollution (a negative externality), then the cost to society of producing aluminum is larger than the cost to aluminum producers.

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The Market for Aluminum and Welfare Economics

For each unit of aluminum produced, the social cost includes the private costs of the producers plus the cost to those bystanders adversely affected by the pollution.

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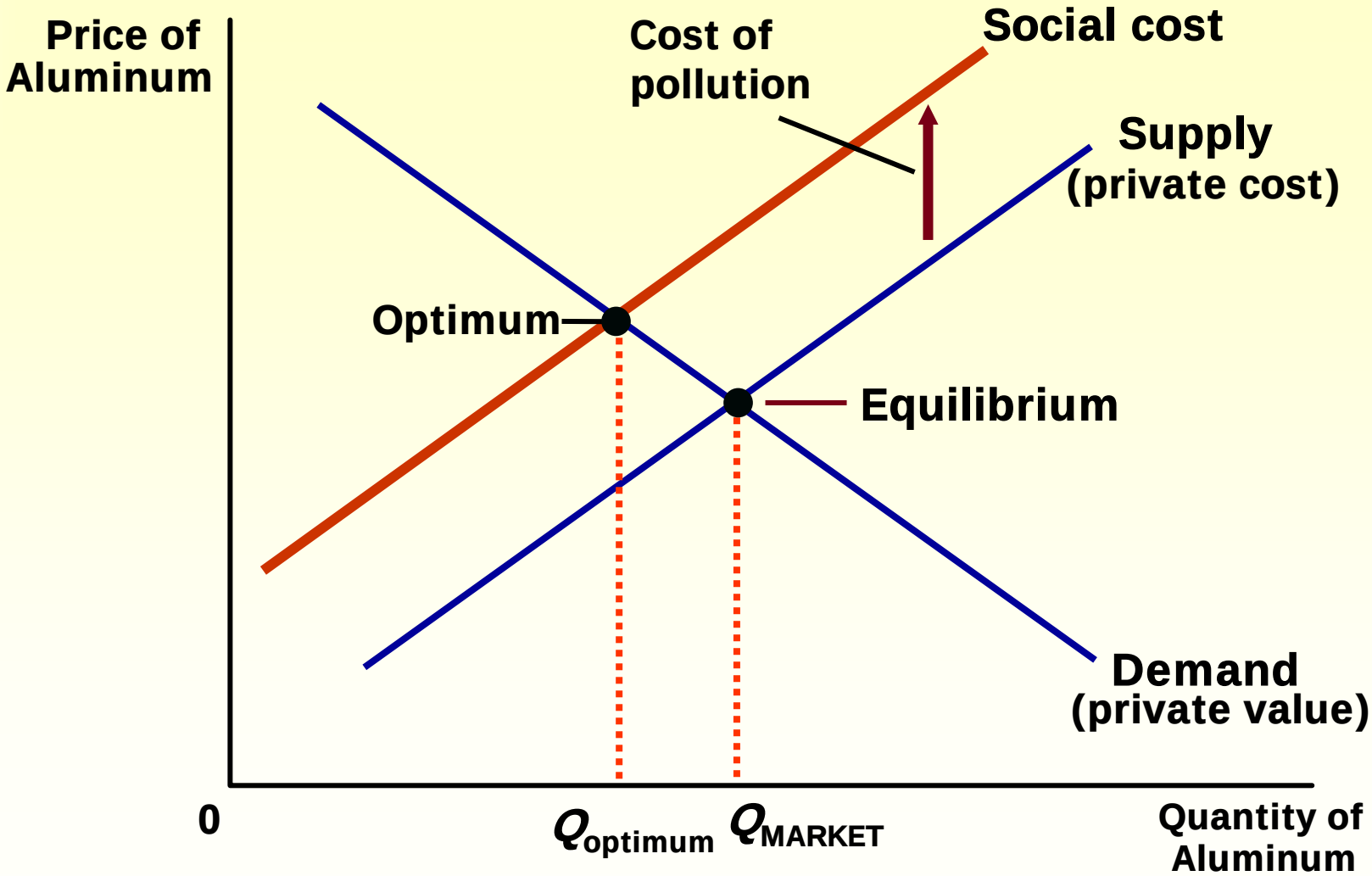
Pollution and the Social Optimum...



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Negative Externalities in Production

The intersection of the demand curve and the social-cost curve determines the optimal output level.

- **The socially optimal output level is less than the market equilibrium quantity.**

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Achieving the Socially Optimal Output

Internalizing an externality involves altering incentives so that people take into account the external effects of their actions.

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Achieving the Socially Optimal Output

The government can internalize an externality by imposing a tax on the producer to reduce the equilibrium quantity to the socially desirable quantity.

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Positive Externalities in Production

When an externality *benefits* the bystanders, a positive externality exists.

- **The social costs of production are less than the private cost to producers and consumers.**

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Positive Externalities in Production

A technology spillover is a type of positive externality that exists when a firm's innovation or design not only benefits the firm, but enters society's pool of technological knowledge and benefits society as a whole.

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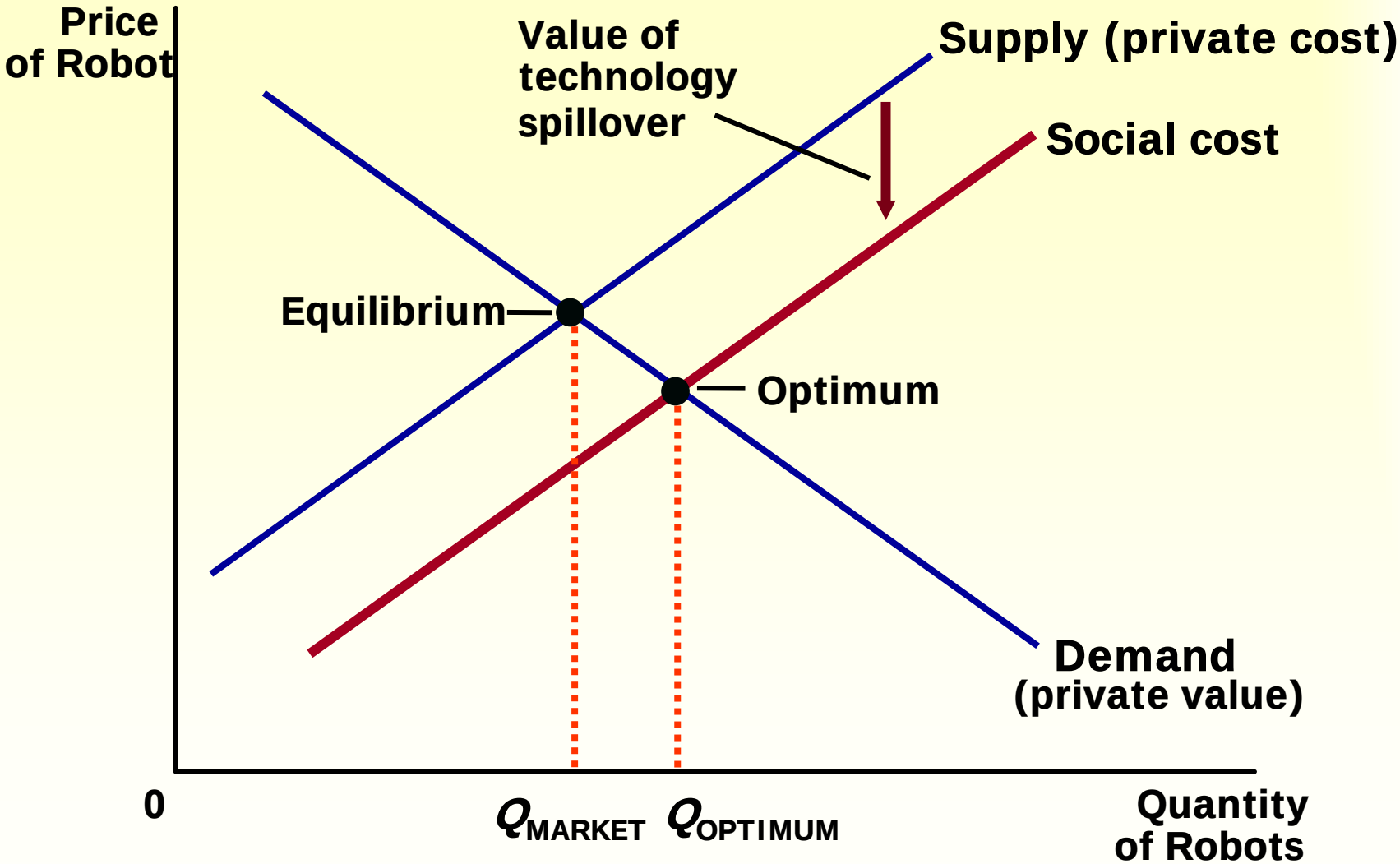
Positive Externalities in Production...



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Positive Externalities in Production

The intersection of the demand curve and the social-cost curve determines the optimal output level.

- **The optimal output level is more than the equilibrium quantity.**
- **The market produces a smaller quantity than is socially desirable.**
- **The social costs of production are less than the private cost to producers and consumers.**

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Internalizing Externalities: Subsidies

Government many times uses subsidies as the primary method for attempting to internalize positive externalities.

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Technology Policy

Government intervention in the economy that aims to promote technology-enhancing industries is called technology policy.

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Technology Policy

- ***Patent laws*** **are a form of technology policy that give the individual (or firm) with patent protection a property right over its invention.**
- **The patent is then said to *internalize* the externality.**

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Internalizing Production Externalities

- Taxes are the primary tools used to internalize negative externalities.
- Subsidies are the primary tools used to internalize positive externalities.

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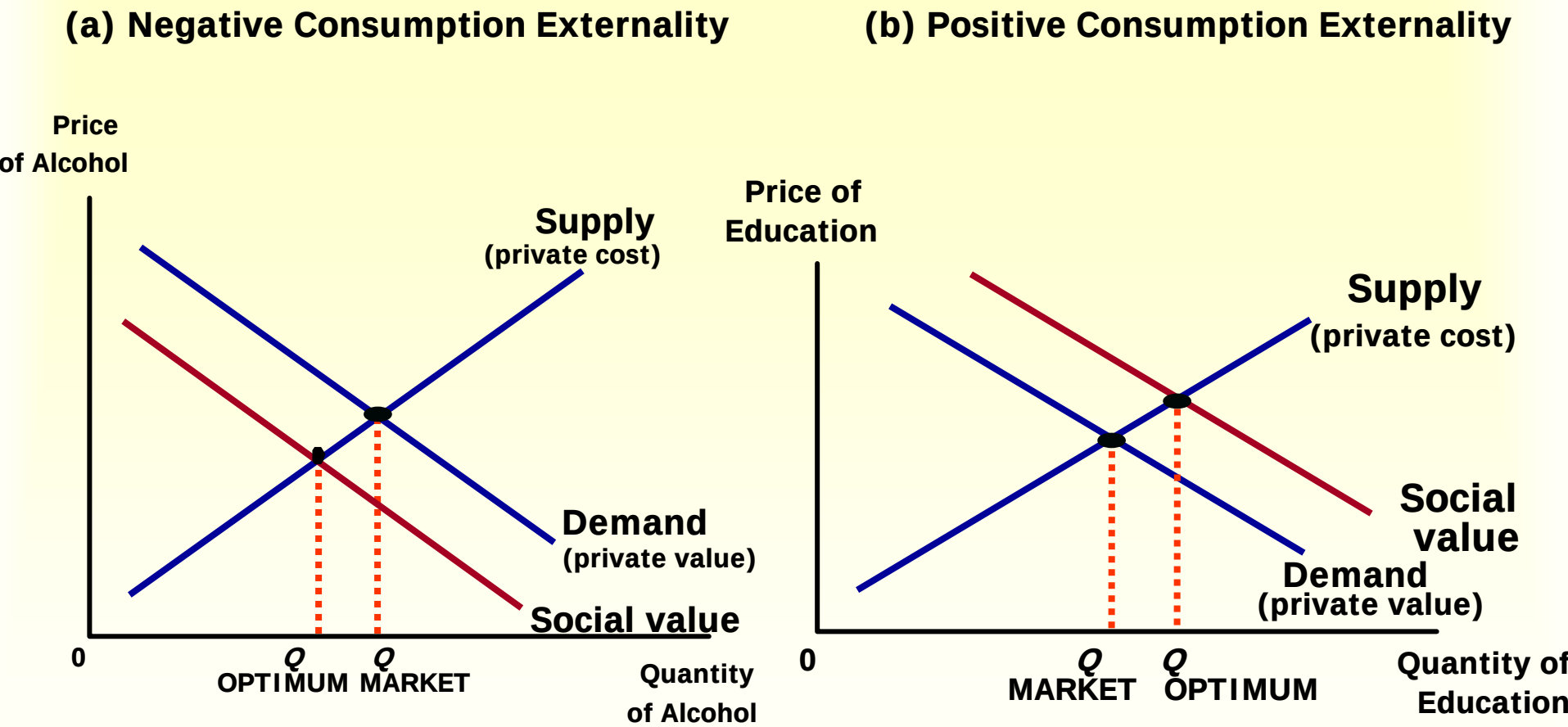
Consumption Externalities...



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Externalities and Market Inefficiency

- Negative externalities in production or consumption lead markets to produce a larger quantity than is socially desirable.
- Positive externalities in production or consumption lead markets to produce a larger quantity than is socially desirable.

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Private Solutions to Externalities

Government action is not always needed to solve the problem of externalities.

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Types of Private Solutions to Externalities

- Moral codes and social sanctions
- Charitable organizations
- Integrating different types of businesses
- Contracting between parties

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The Coase Theorem

The Coase Theorem states that if private parties can bargain without cost over the allocation of resources, then the private market will always solve the problem of externalities on its own and allocate resources efficiently.

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Transactions Costs

Transaction costs are the costs that parties incur in the process of agreeing to and following through on a bargain.

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Why Private Solutions Do Not Always Work

Sometimes the private solution approach fails because transaction costs can be so high that private agreement is not possible.

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Public Policy Toward Externalities

When externalities are significant and private solutions are not found, government may attempt to solve the problem through . . .

. . . command-and-control policies.

. . . market-based policies.

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Command-and-Control Policies

- Usually take the form of regulations:
  - Forbid certain behaviors.
  - Require certain behaviors.
- Examples:
  - Requirements that all students be immunized.
  - Stipulations on pollution emission levels set by the Environmental Protection Agency (EPA).

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Market-Based Policies

- Government uses taxes and subsidies to align private incentives with social efficiency.
- **Pigovian taxes** are taxes enacted to correct the effects of a negative externality.

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Examples of Regulation versus Pigovian tax

If the EPA decides it wants to reduce the amount of pollution coming from a specific plant. The EPA could…

…tell the firm to reduce its pollution by a specific amount (i.e. regulation).

…levy a tax of a given amount for each unit of pollution the firm emits (i.e. Pigovian tax).

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Market-Based Policies

- **Tradable pollution permits** allow the voluntary transfer of the right to pollute from one firm to another.
  - A market for these permits will eventually develop.
  - A firm that can reduce pollution at a low cost may prefer to sell its permit to a firm that can reduce pollution only at a high cost.

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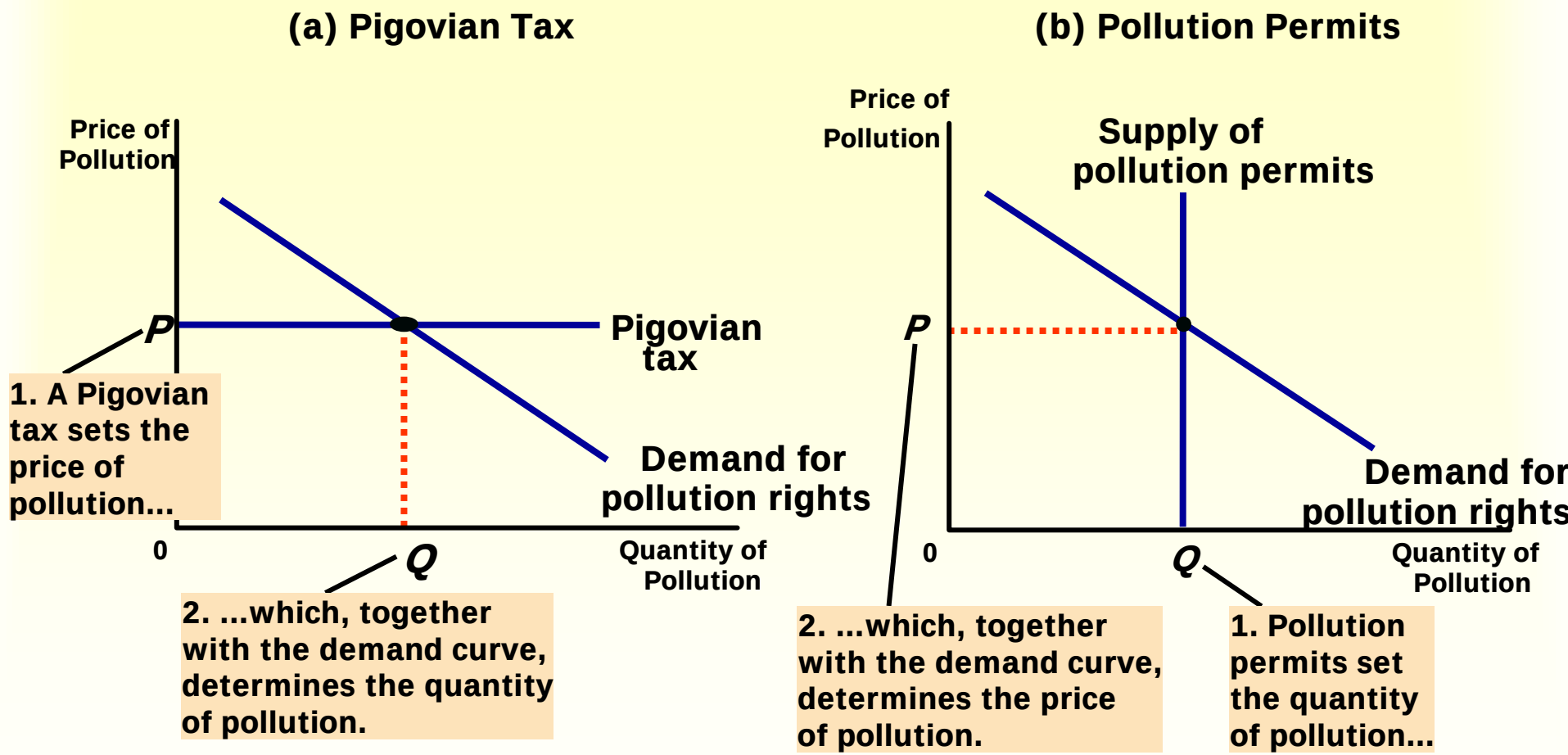
The Equivalence of Pigovian Taxes and Pollution Permits...



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Summary

- When a transaction between a buyer and a seller directly affects a third party, the effect is called an externality.
- Negative externalities cause the socially optimal quantity in a market to be less than the equilibrium quantity.
- Positive externalities cause the socially optimal quantity in a market to be greater than the equilibrium quantity.

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Summary

- Those affected by externalities can sometimes solve the problem privately.
- The Coase theorem states that if people can bargain without a cost, then they can always reach an agreement in which resources are allocated efficiently.

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Summary

- When private parties cannot adequately deal with externalities, then the government steps in.
- The government can either regulate behavior or internalize the externality by using Pigovian taxes.

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Graphical Review

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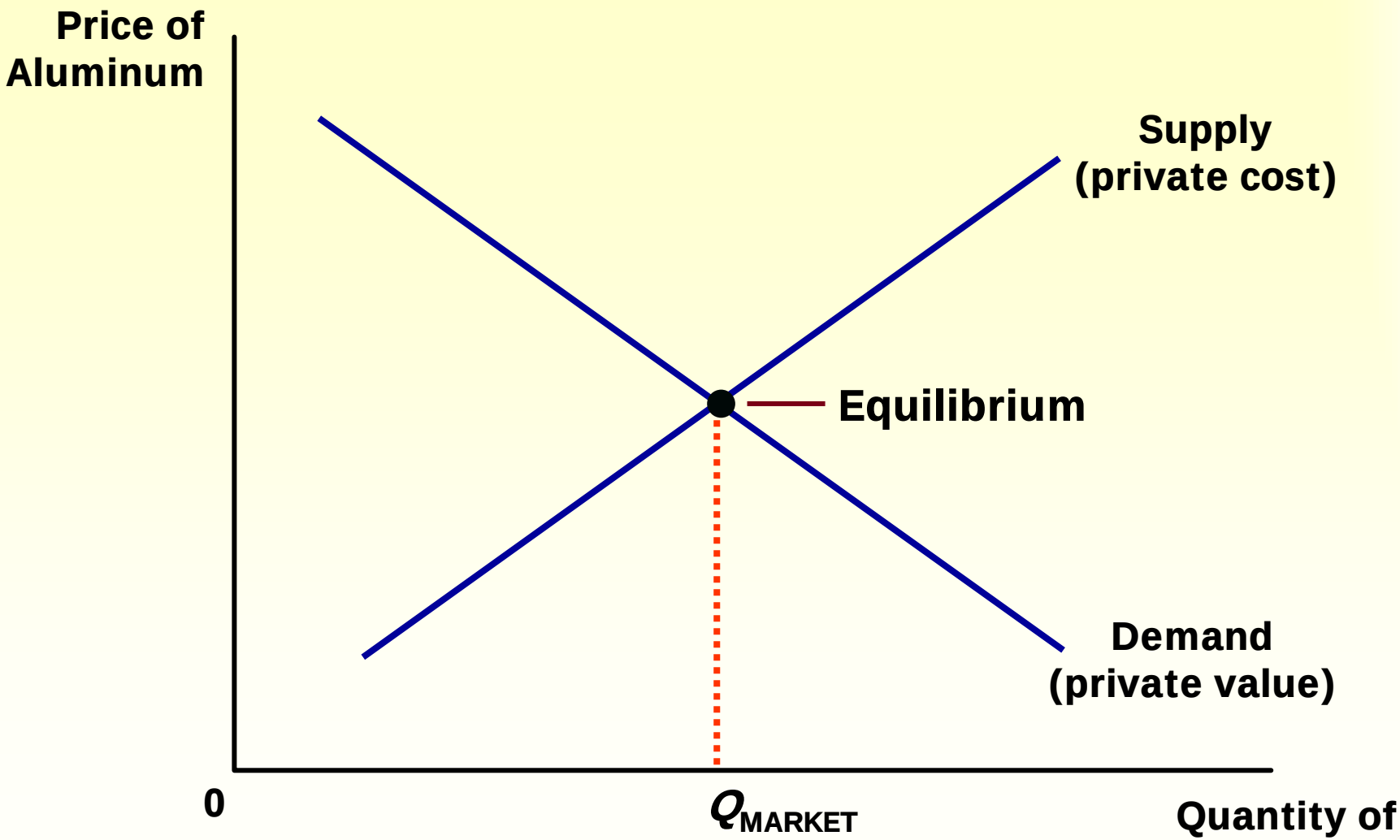

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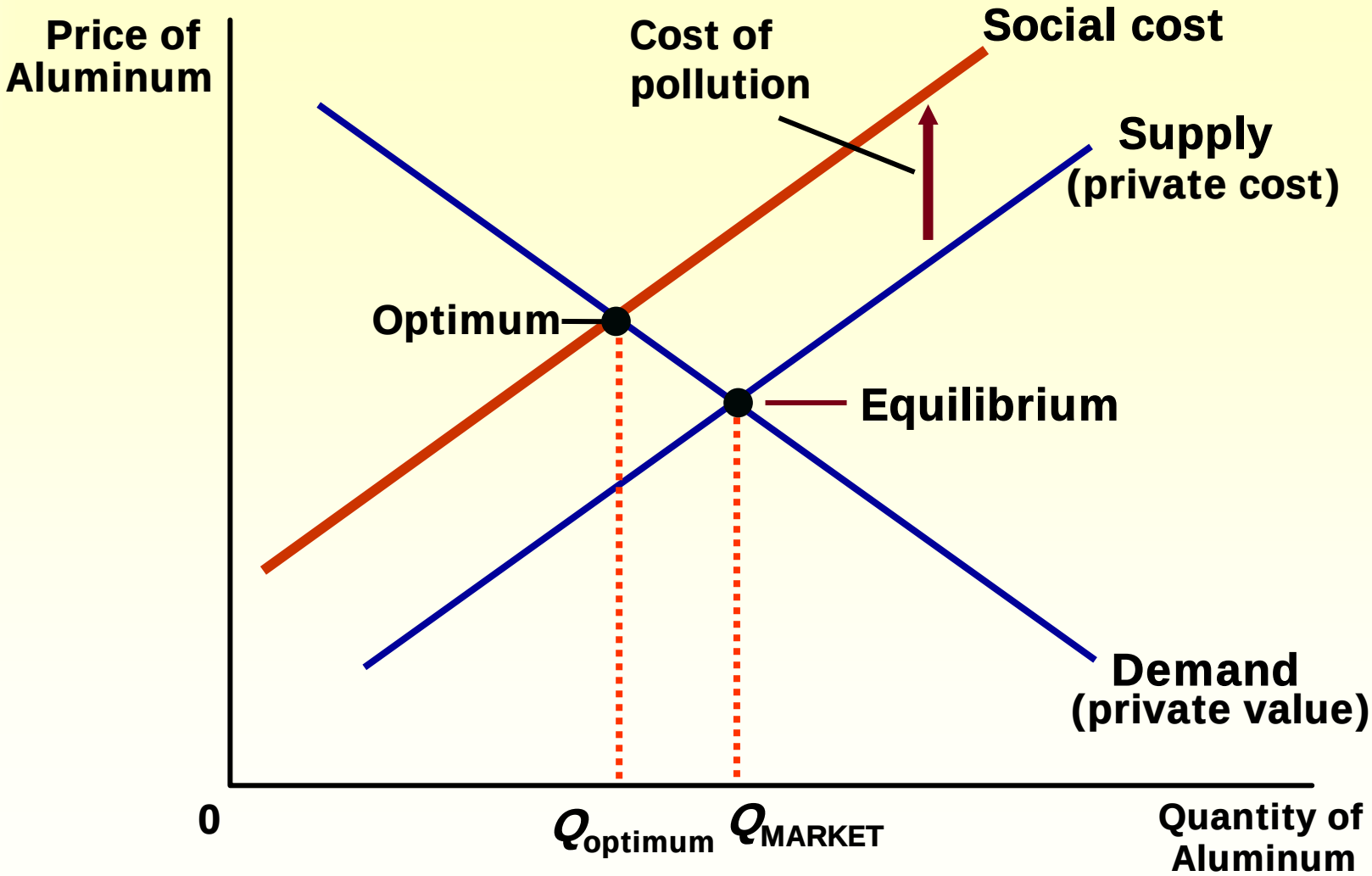
Pollution and the Social Optimum...



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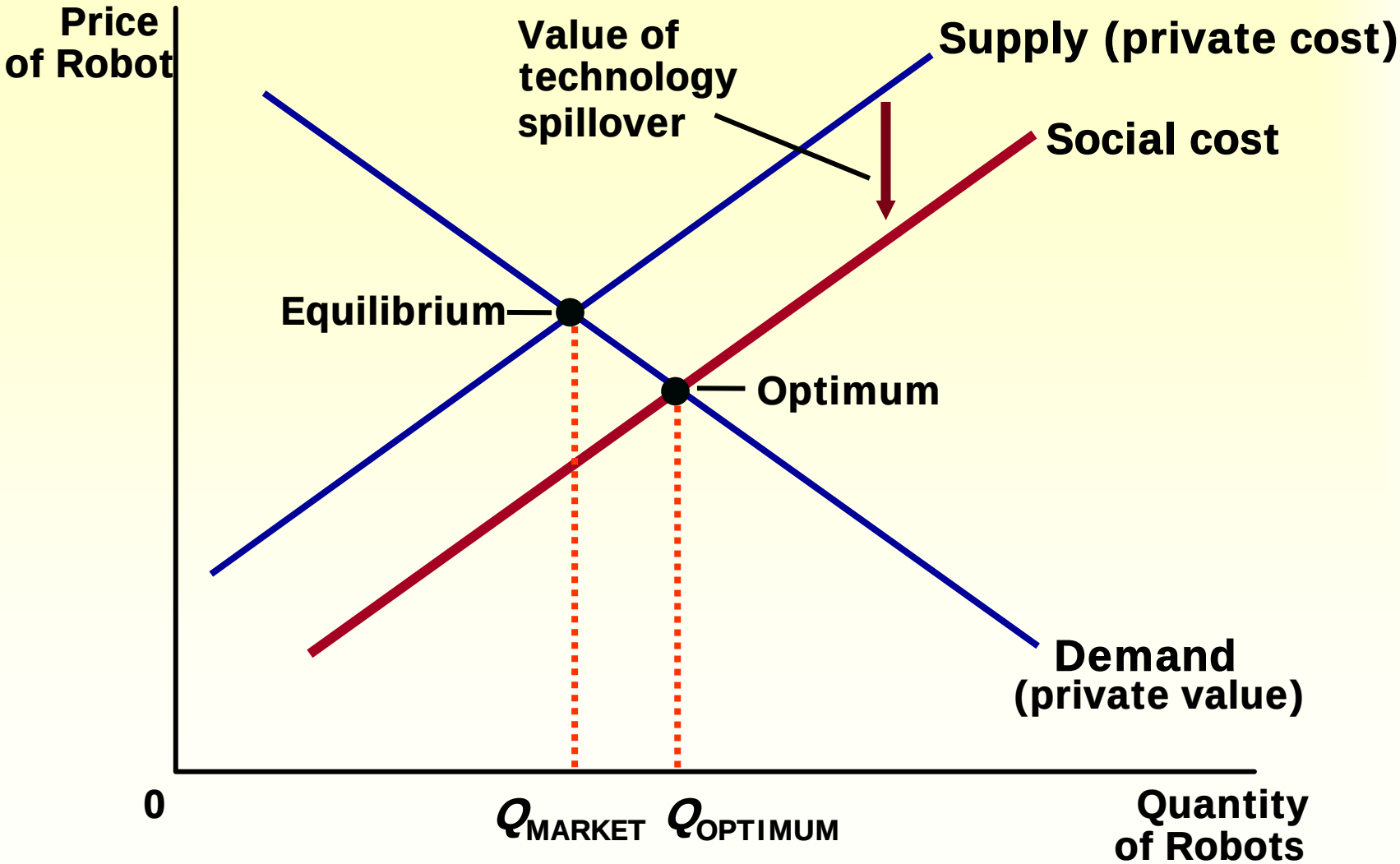
Positive Externalities in Production...



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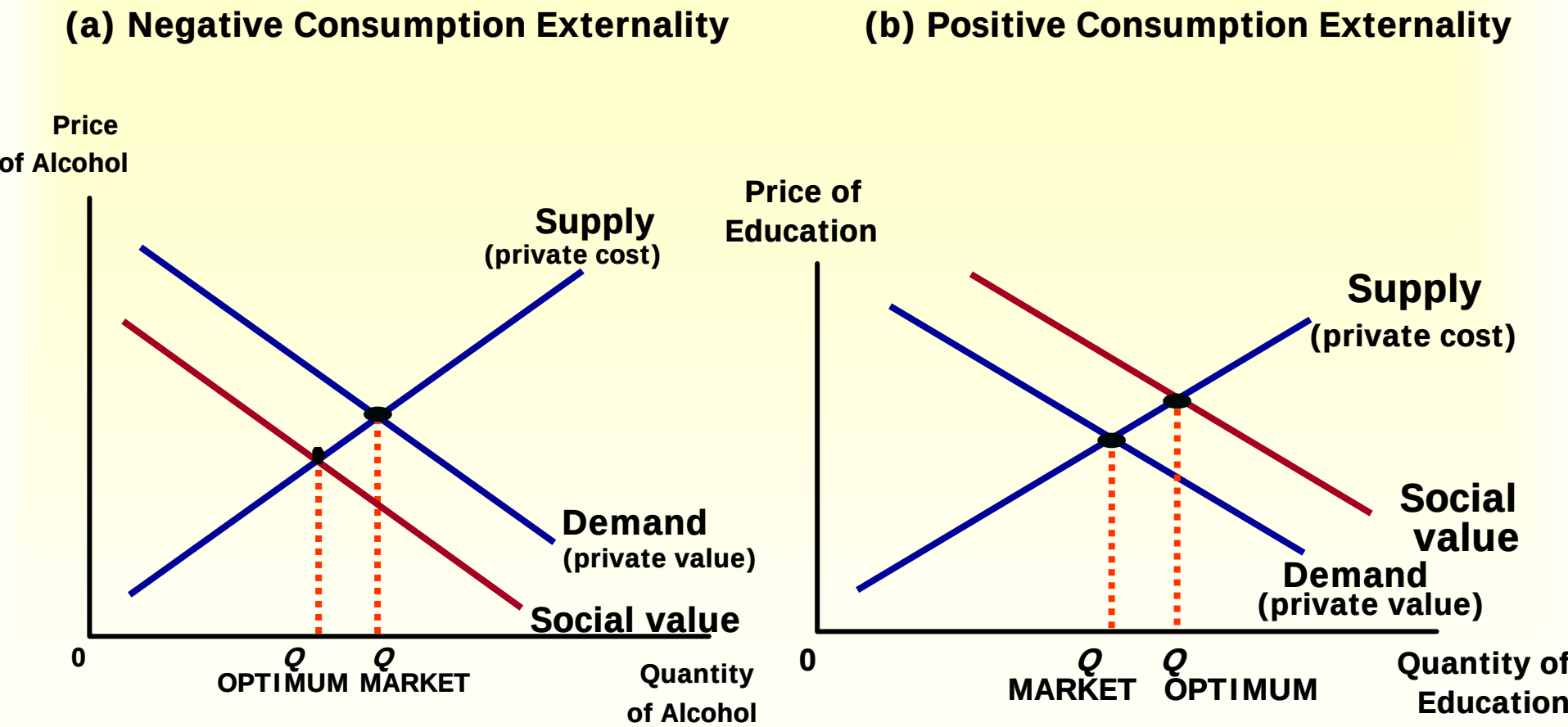
Consumption Externalities...



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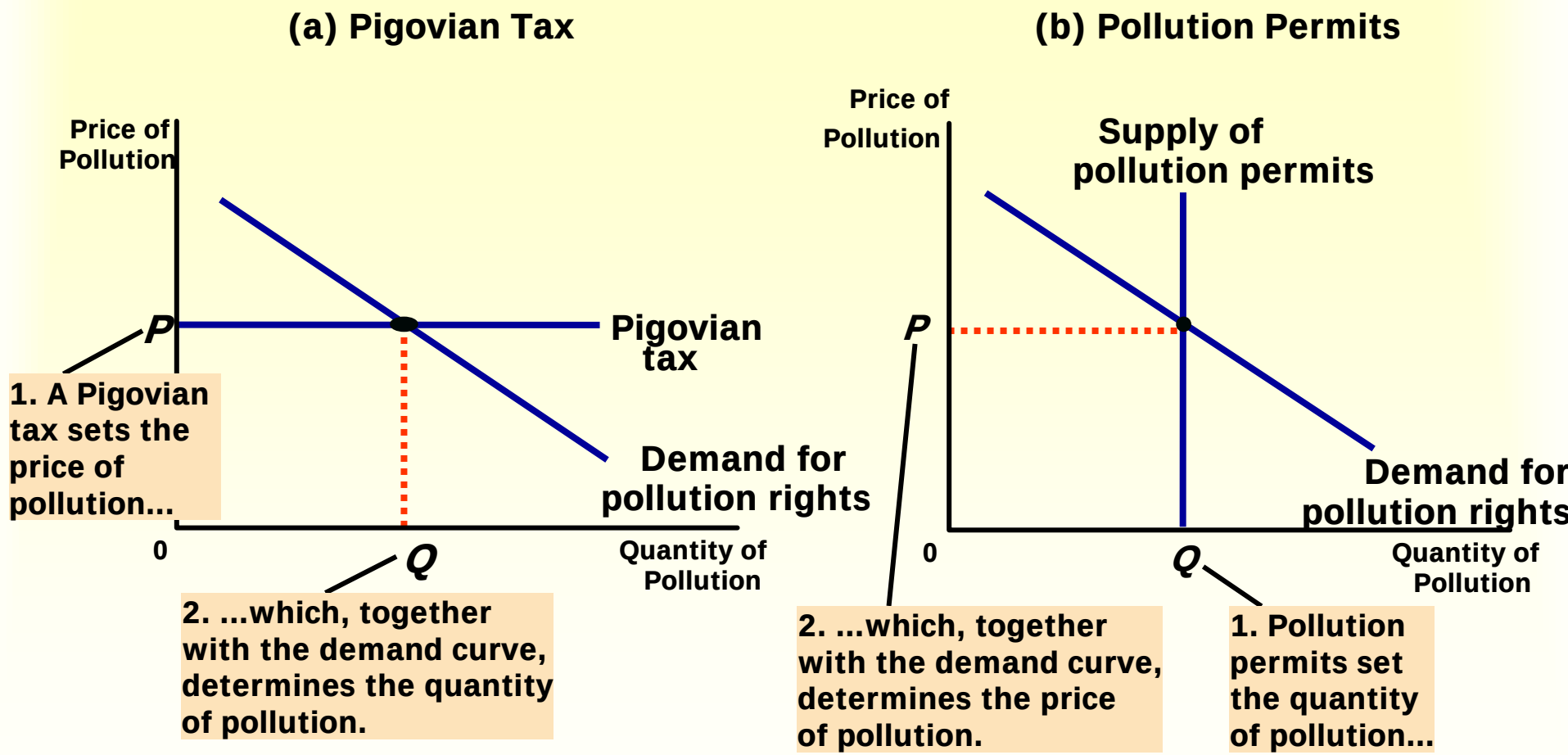
The Equivalence of Pigovian Taxes and Pollution Permits...



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Public Goods and Common Resources

Chapter 11

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“The best things in life are free. . .”

Free goods provide a special challenge for economic analysis

Most goods in our economy are allocated in markets…

…for these goods, prices are the signals that guide the decisions of buyers and sellers.

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“The best things in life are free. . .”

When goods are available free of charge, the market forces that normally allocate resources in our economy are absent.

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“The best things in life are free. . .”

When a good does not have a price attached to it, private markets cannot ensure that the good is produced and consumed in the proper amounts.

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“The best things in life are free. . .”

In such cases, government policy can potentially remedy the market failure that results, and raise economic well-being.

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The Different Kinds of Goods

When thinking about the various goods in the economy, it is useful to group them according to two characteristics:

- ***Is the good excludable?***
- ***Is the good rival?***

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The Different Kinds of Goods

- **Excludability**
- **People can be prevented from enjoying the good.**
- **Laws recognize and enforce private property rights.**

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The Different Kinds of Goods

- **Rivalness**
  - **One person's use of the good diminishes another person's enjoyment of it.**

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Four Types of Goods

- Private Goods
- Public Goods
- Common Resources
- Natural Monopolies

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Types of Goods

- **Private Goods**
  - Are both excludable and rival.
- **Public Goods**
  - Are neither excludable nor rival.

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Types of Goods

- **Common Resources**
  - **Are rival but not excludable.**
- **Natural Monopolies**
  - **Are excludable but not rival.**

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Types of Goods

Excludable? \ Rival?	Yes	No
Yes	**Private Goods** • Ice-cream cones • Clothing • Congested toll roads	**Natural Monopolies** • Fire protection • Cable TV • Uncongested toll roads
No	**Common Resources** • Fish in the ocean • The environment • Congested nontoll roads	**Public Goods** • National defense • Knowledge • Uncongested nontoll roads

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The Free-Rider Problem

A free-rider is a person who receives the benefit of a good but avoids paying for it.

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The Free-Rider Problem

- Since people cannot be excluded from enjoying the benefits of a public good, individuals may withhold paying for the good hoping that others will pay for it.
- The free-rider problem prevents private markets from supplying public goods.

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Solving the Free-Rider Problem

- The government can decide to provide the public good if the total benefits exceed the costs.
- The government can make everyone better off by providing the public good and paying for it with tax revenue.

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Some Important Public Goods

- *National Defense*
- *Basic Research*
- *Programs to Fight Poverty*

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Are Lighthouses Public Goods?

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Cost-Benefit Analysis

- In order to decide whether to provide a public good or not, the total benefits of all those who use the good must be compared to the costs of providing and maintaining the public good.
- **Cost benefit** analysis estimates the total costs and benefits of a good to society as a whole.

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Cost-Benefit Analysis

- A **cost-benefit analysis** would be used to estimate the total costs and benefits of the project to society as a whole.
  - It is difficult to do because of the absence of prices needed to estimate social benefits and resource costs.
  - The value of life, the consumer's time, and aesthetics are difficult to assess.

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Common Resources

Common resources, like public goods, are not excludable. They are available free of charge to anyone who wishes to use them.

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Common Resources

Common resources are rival goods because one person's use of the common resource reduces other people's use.

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Tragedy of the Commons

The Tragedy of the Commons is a story with a general lesson: When one person uses a common resource, he or she diminishes another person's enjoyment of it.

- **Common resources tend to be used excessively when individuals are not charged for their usage.**
- **This creates a negative externality.**

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Examples of Common Resources

- *Clean air and water*
- *Oil pools*
- *Congested roads*
- *Fish, whales, and other wildlife*

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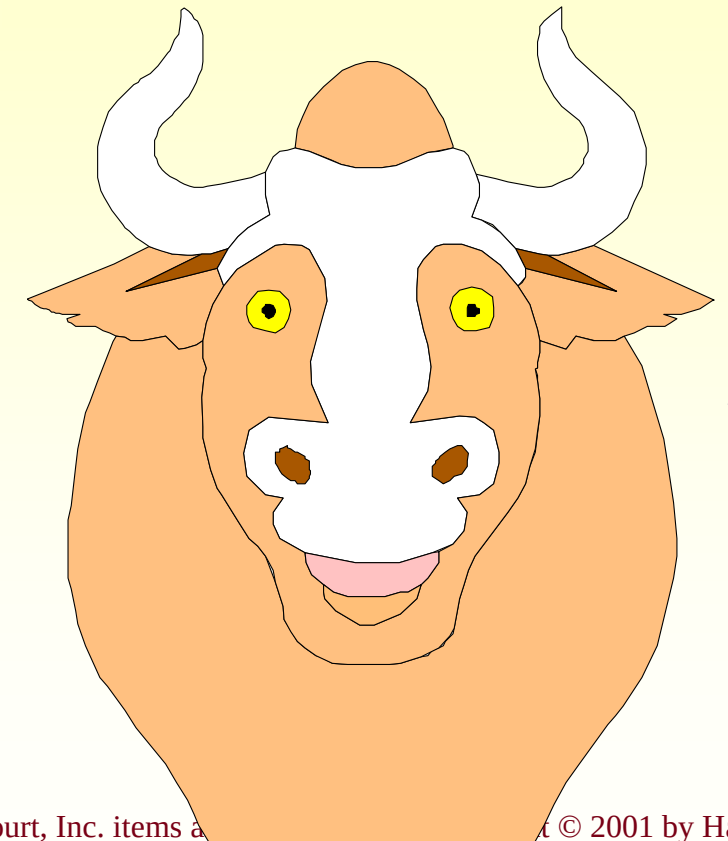
Why Isn’t the Cow Extinct?



Private Ownership and the Profit Motive!

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Importance of Property Rights

The market fails to allocate resources efficiently when property rights are not well-established (i.e. some item of value does not have an owner with the legal authority to control it).

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Importance of Property Rights

When the absence of property rights causes a market failure, the government can potentially solve the problem.

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Summary

- Goods differ in whether they are excludable and whether they are rival.
- A good is excludable if it is possible to prevent someone from using it.
- A good is rival if one person's enjoyment of the good prevents other people from enjoying the same unit of the good.

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Summary

- Public goods are neither rival nor excludable.
- Because people are not charged for their use of public goods, they have an incentive to free ride when the good is provided privately.
- Governments provide public goods, making quantity decisions based upon cost-benefit analysis.

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Summary

- Common resources are rival but not excludable.
- Because people are not charged for their use of common resources, they tend to use them excessively.
- Governments tend to try to limit the use of common resources.

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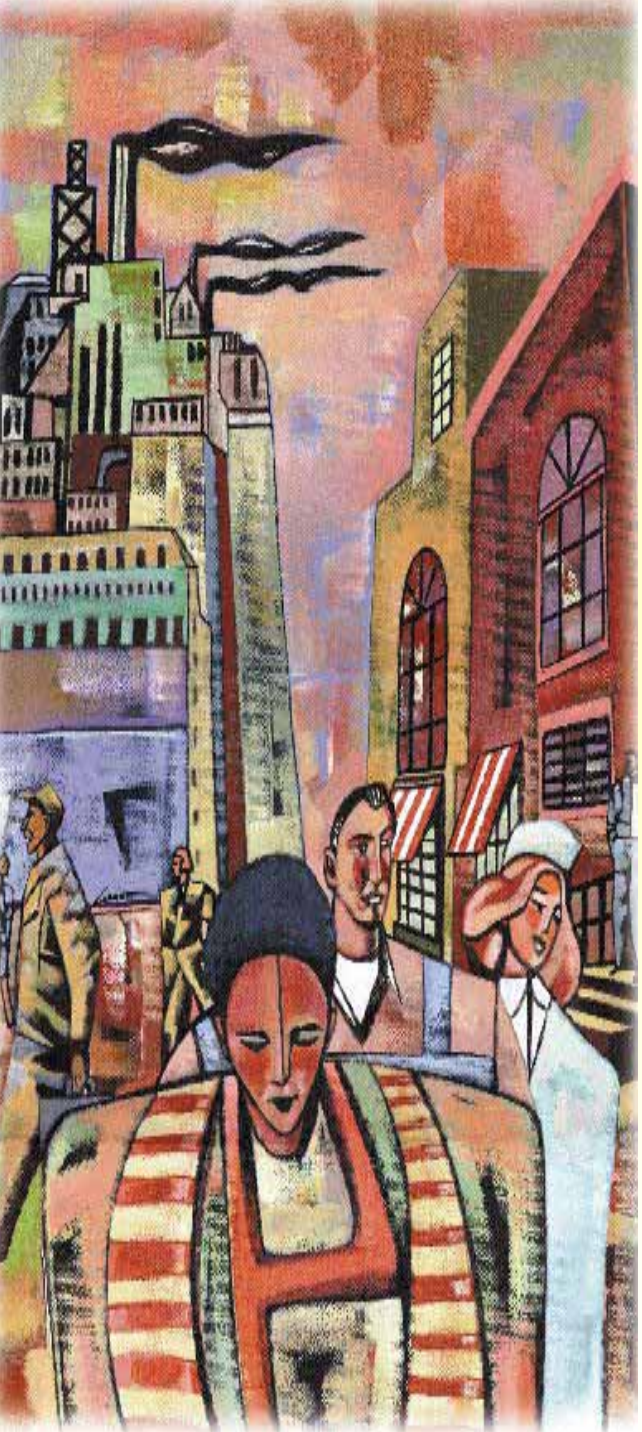

The Costs of Production

Chapter 13

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The Costs of Production

The Law of Supply:

- **Firms are willing to produce and sell a greater quantity of a good when the price of the good is high.**
- **This results in a supply curve that slopes upward.**

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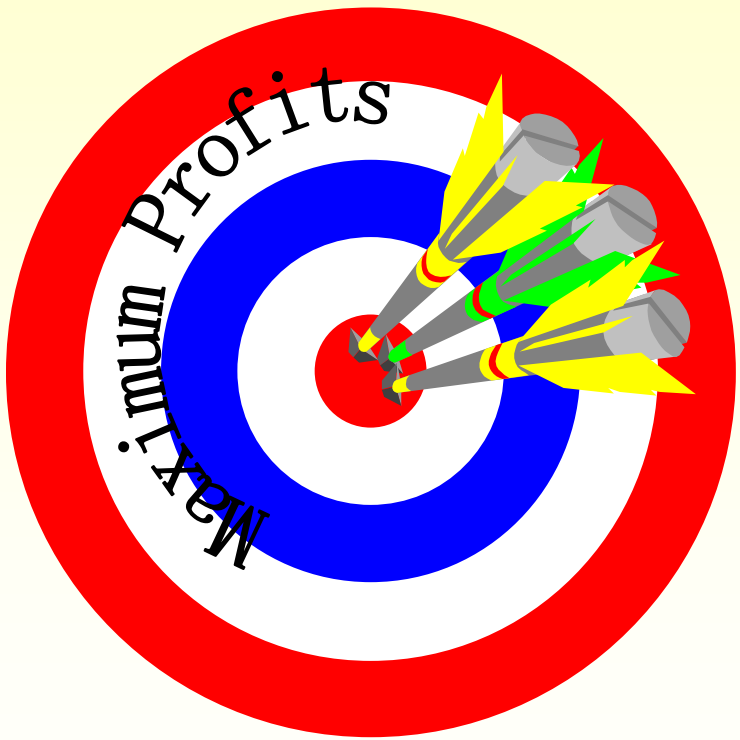
The Firm's Objective

The economic goal of the firm is to maximize profits.



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A Firm's Total Revenue and Total Cost

- **Total Revenue**
  - The amount that the firm receives for the sale of its output.
- **Total Cost**
  - The amount that the firm pays to buy inputs.

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A Firm's Profit

Profit is the firm's total revenue minus its total cost.

Profit = Total revenue - Total cost

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Costs as Opportunity Costs

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

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Explicit and Implicit Costs

A firm's cost of production include explicit costs and implicit costs.

- **Explicit costs** involve a direct money outlay for factors of production.
- **Implicit costs** do not involve a direct money outlay.

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Economic Profit versus Accounting Profit

- Economists measure a firm's **economic profit** as total revenue minus all the opportunity costs (explicit and implicit).
- 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.

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Economic Profit versus Accounting Profit

- When total revenue exceeds both explicit and implicit costs, the firm earns economic profit.
  - Economic profit is smaller than accounting profit.

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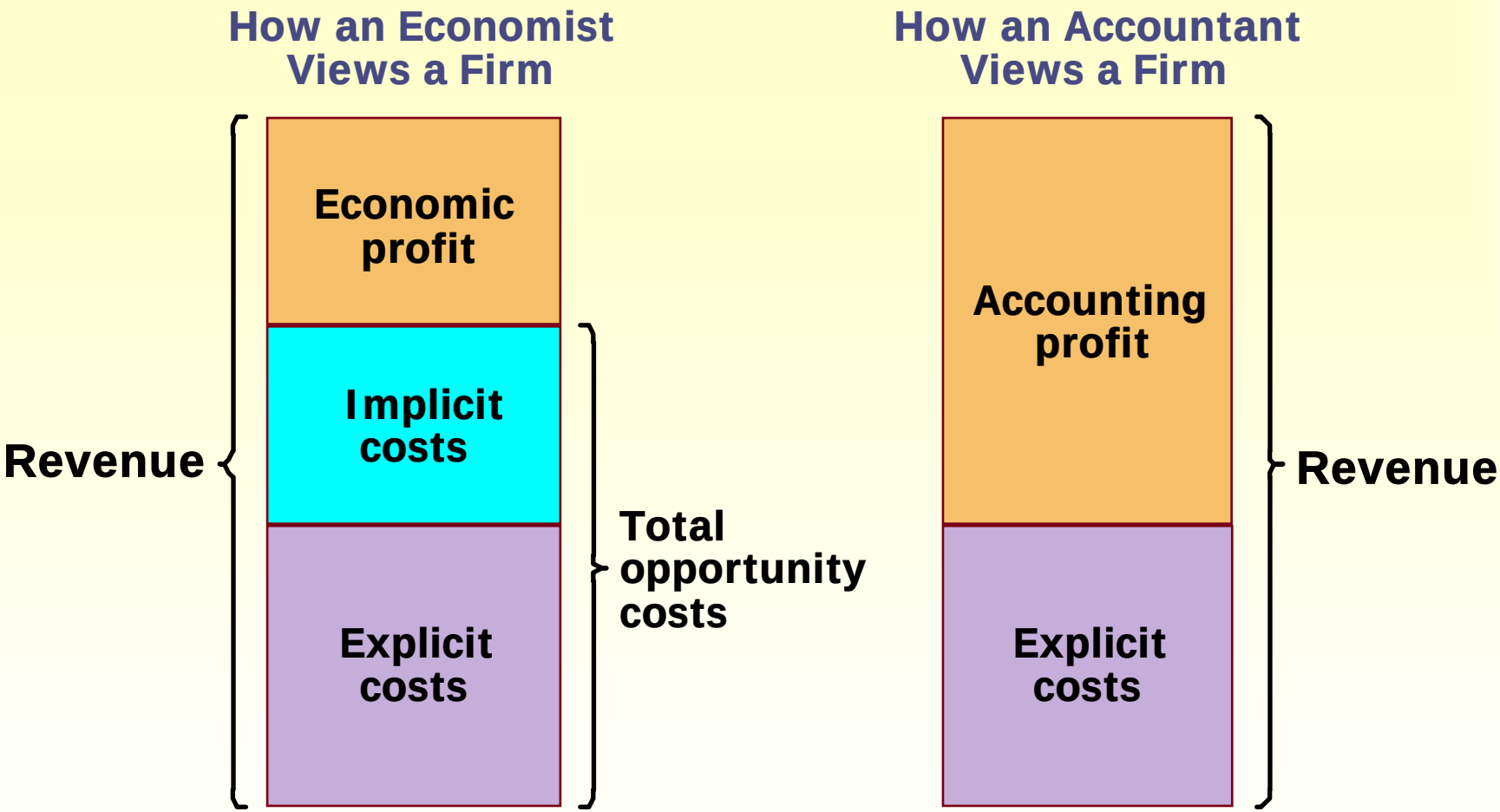
Economic Profit versus Accounting Profit



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A Production Function and Total Cost

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

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The Production Function

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

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Marginal Product

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.

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Marginal Product

$$\text{Marginal product} = \frac{\text{Additional output}}{\text{Additional input}}$$

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Diminishing Marginal Product

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

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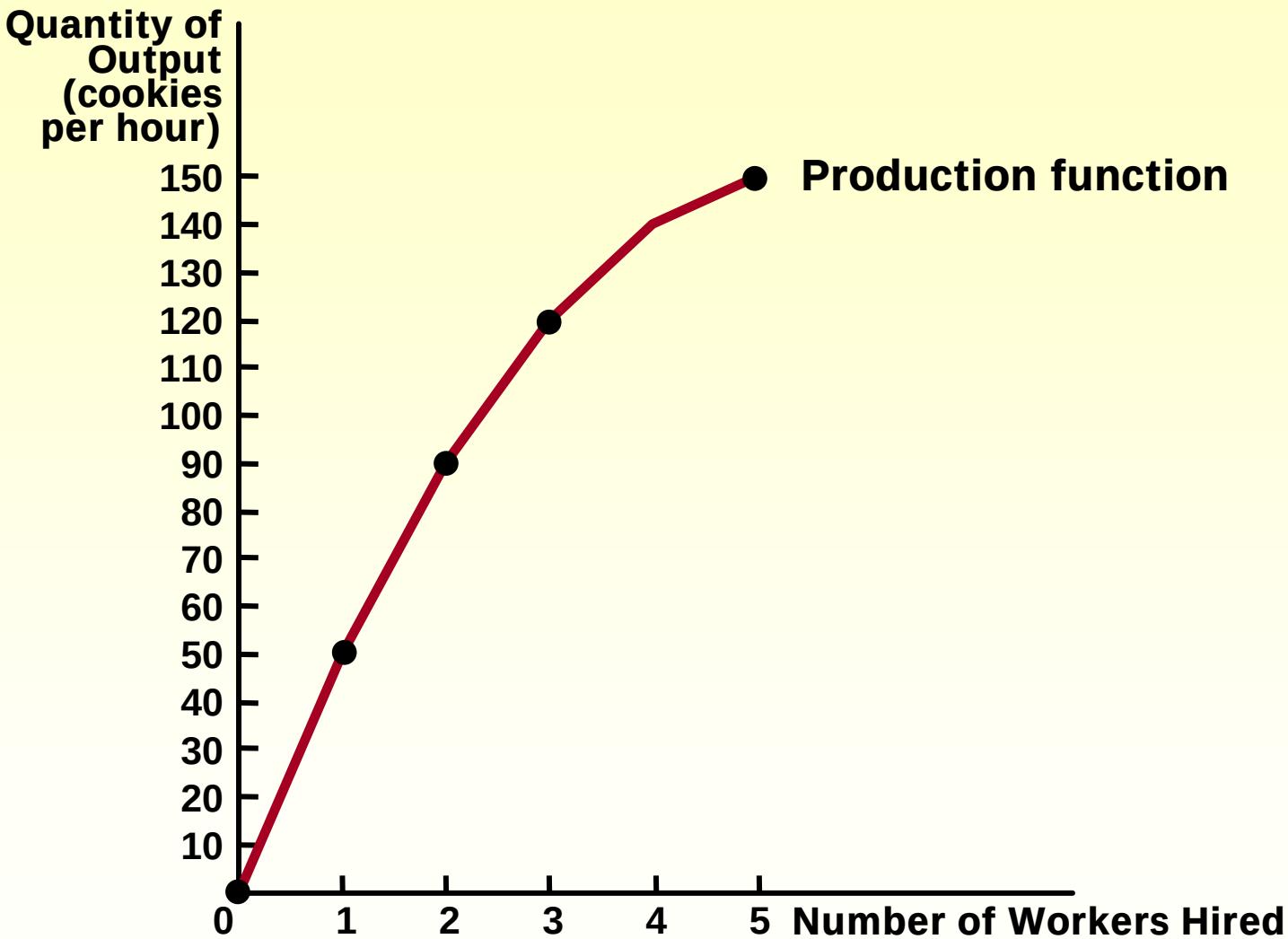
A Production Function...



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Diminishing Marginal Product

- The slope of the production function measures the marginal product of an input, such as a worker.
- When the marginal product declines, the production function becomes flatter.

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From the Production Function to the Total-Cost Curve

- The relationship between the quantity a firm can produce and its costs determines pricing decisions.
- The *total-cost curve* shows this relationship graphically.

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A Production Function and Total Cost

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

Hungry Helen's Cookie Factory

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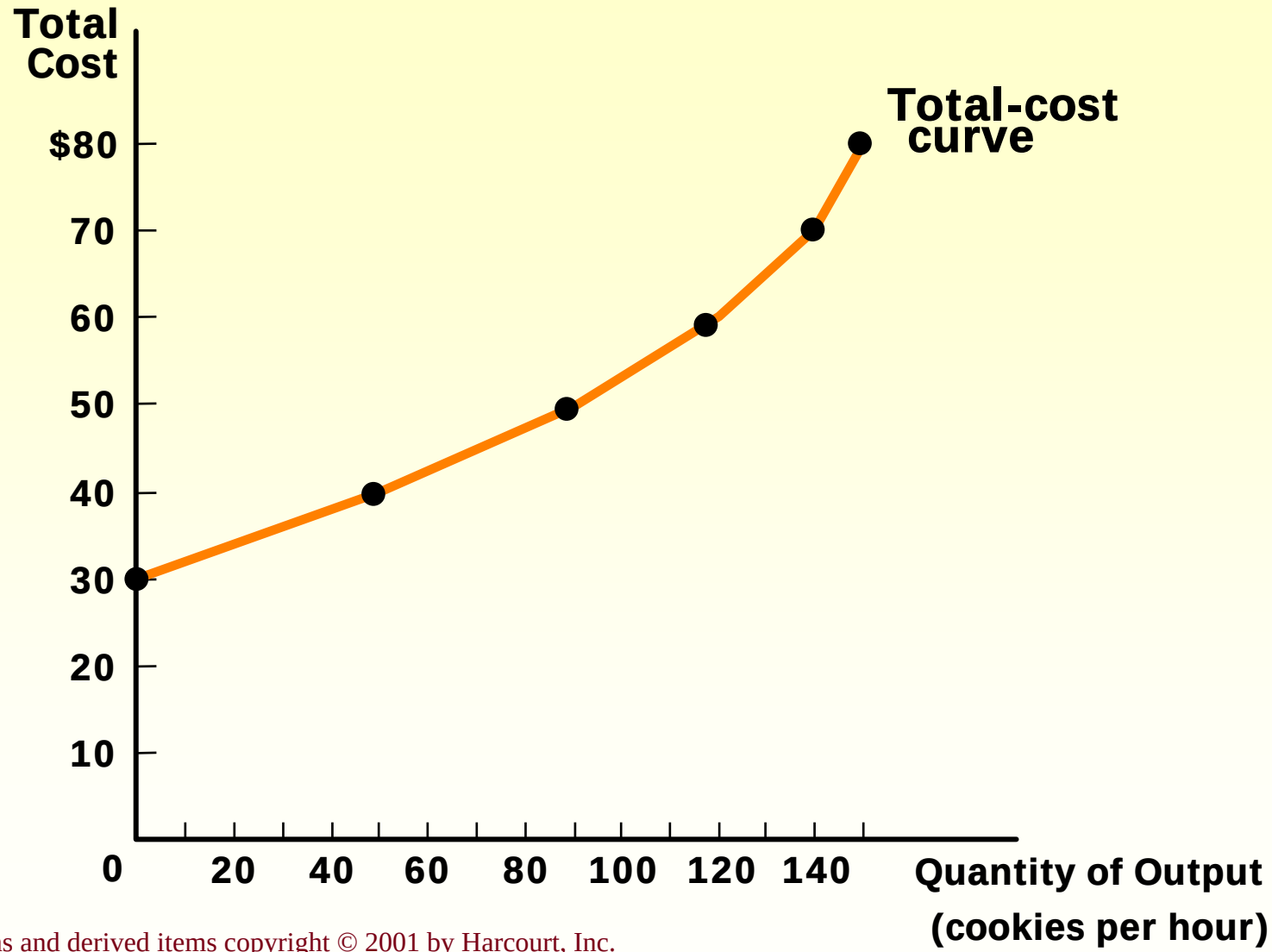
Total-Cost Curve...



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The Various Measures of Cost

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

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Fixed and Variable Costs

- **Fixed costs** are those costs that do *not* vary with the quantity of output produced.
- **Variable costs** are those costs that *do* change as the firm alters the quantity of output produced.

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Family of Total Costs

- Total Fixed Costs (TFC)
- Total Variable Costs (TVC)
- Total Costs (TC)

$$TC = TFC + TVC$$

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Family of Total Costs

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

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Average Costs

- **Average costs** can be determined by dividing the firm's costs by the quantity of output produced.
- The average cost is the cost of each typical unit of product.

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Family of Average Costs

- Average Fixed Costs (AFC)
- Average Variable Costs (AVC)
- Average Total Costs (ATC)

$$ATC = AFC + AVC$$

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Family of Average Costs

$$AFC = \frac{\text{Fixed cost}}{\text{Quantity}} = \frac{FC}{Q}$$

$$AVC = \frac{\text{Variable cost}}{\text{Quantity}} = \frac{VC}{Q}$$

$$ATC = \frac{\text{Total cost}}{\text{Quantity}} = \frac{TC}{Q}$$

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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

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Marginal Cost

- **Marginal cost (MC) measures the amount total cost rises when the firm increases production by one unit.**
- **Marginal cost helps answer the following question:**
  - **How much does it cost to produce an additional unit of output?**

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Marginal Cost

$$MC = \frac{\text{(Change in total cost)}}{\text{(Change in quantity)}}$$

$$= \Delta TC / \Delta Q$$

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Marginal Cost

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

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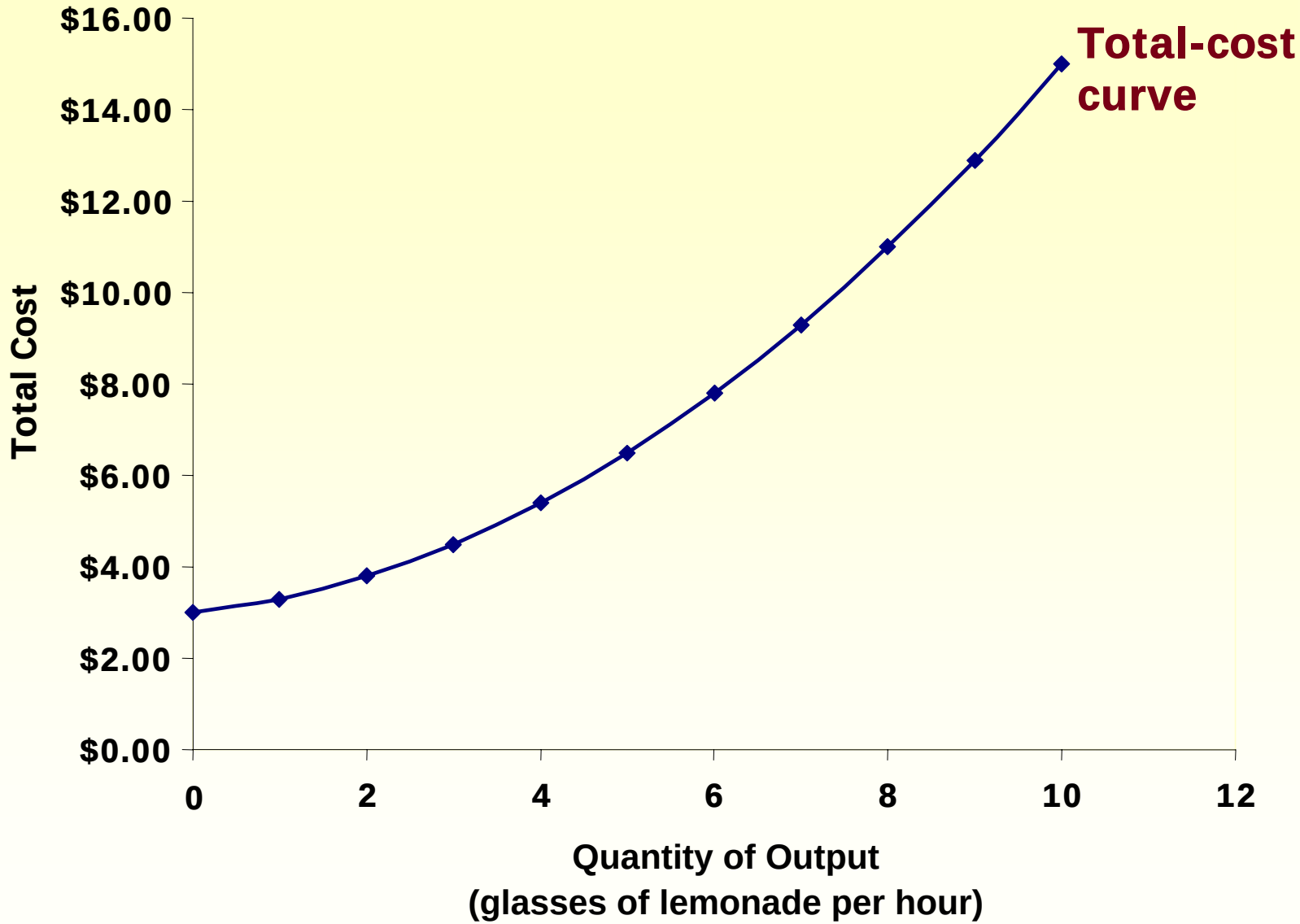
Total-Cost Curve...



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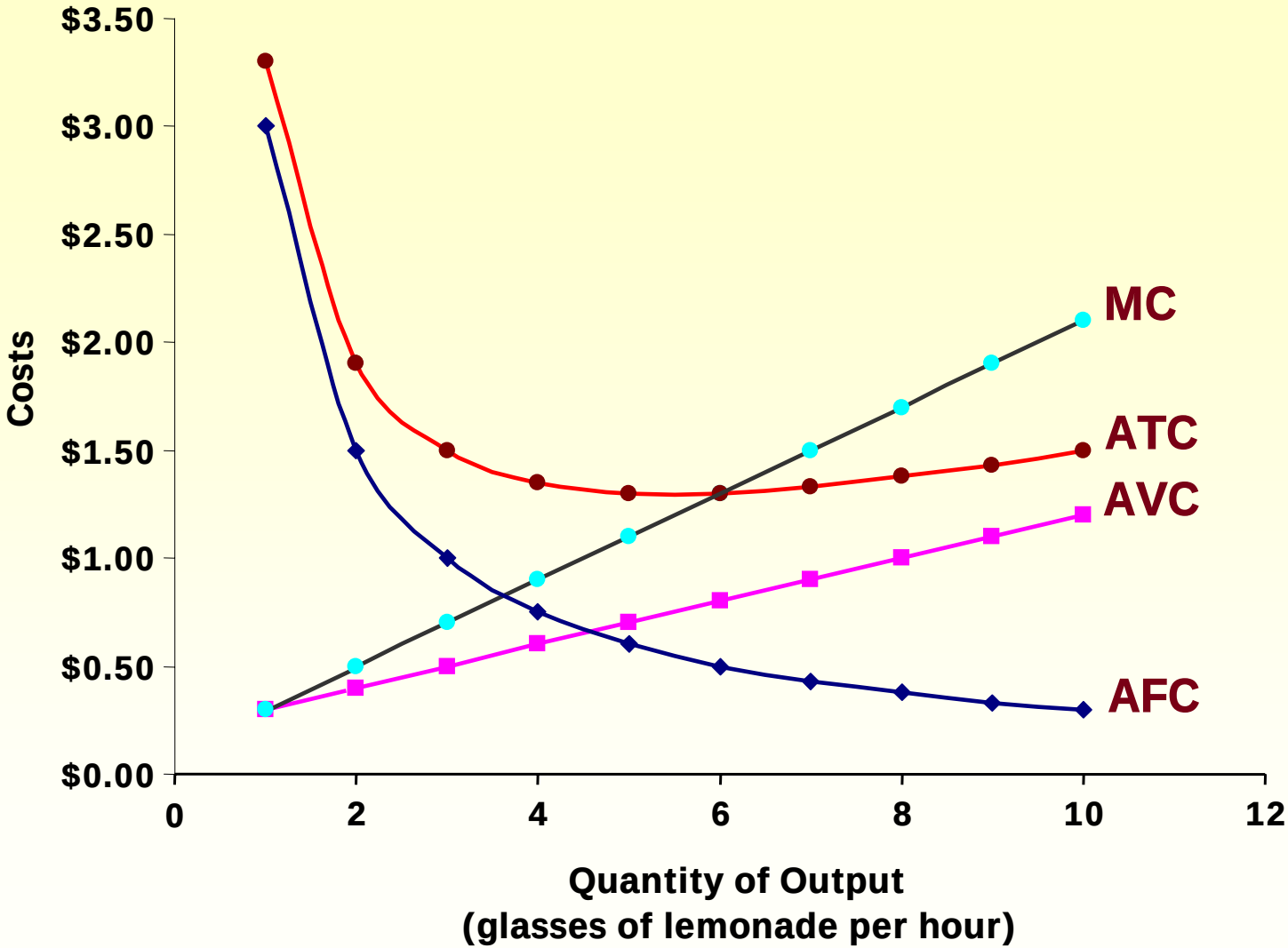
Average-Cost and Marginal-Cost Curves...



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Cost Curves and Their Shapes

Marginal cost rises with the amount of output produced.

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

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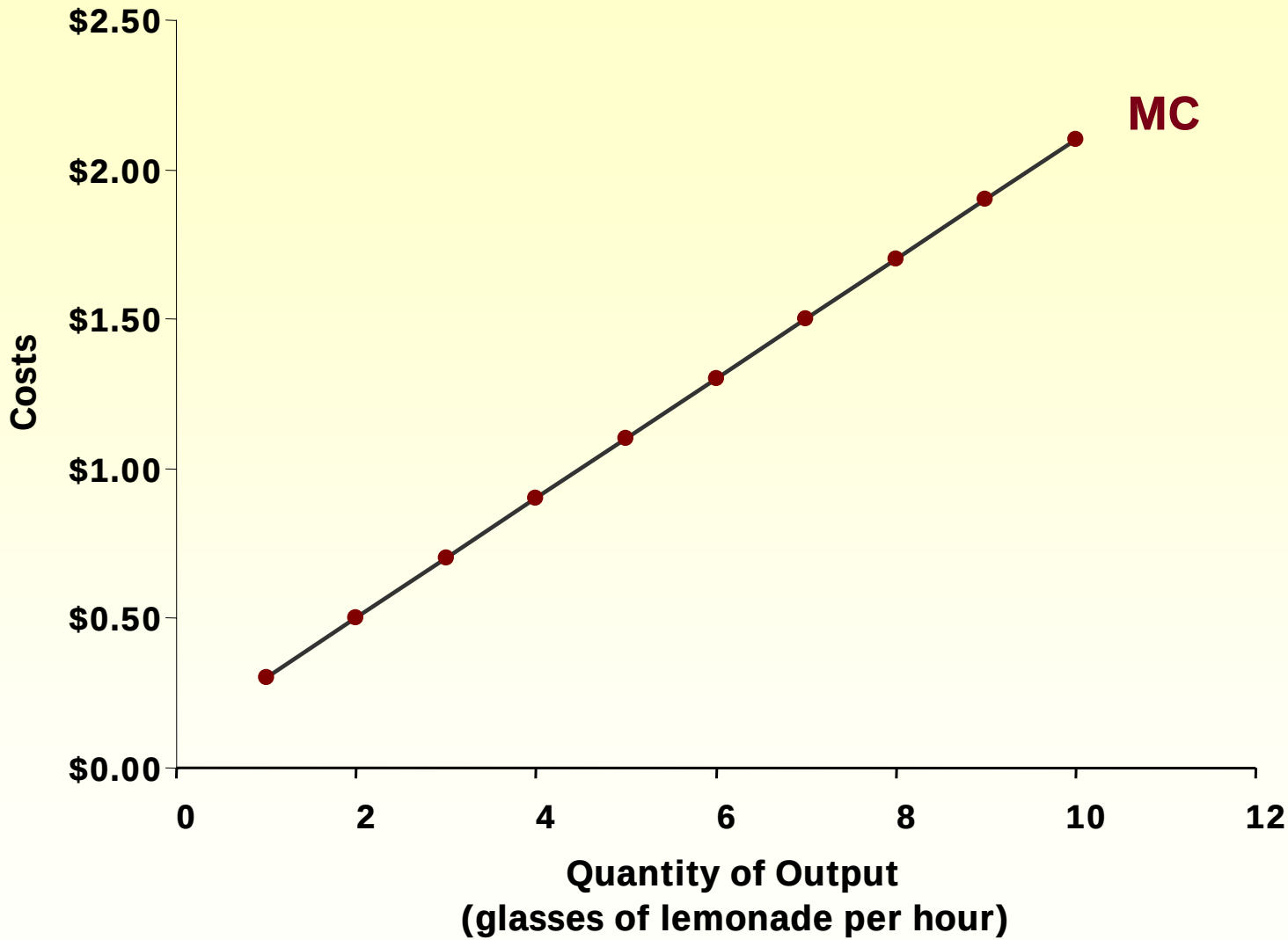
Cost Curves and Their Shapes



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Cost Curves and Their Shapes

The average total-cost curve is U-shaped.

- At very low levels of output average total cost is high because fixed cost is spread over only a few units.
- Average total cost declines as output increases.
- Average total cost starts rising because average variable cost rises substantially.

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Cost Curves and Their Shapes

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.

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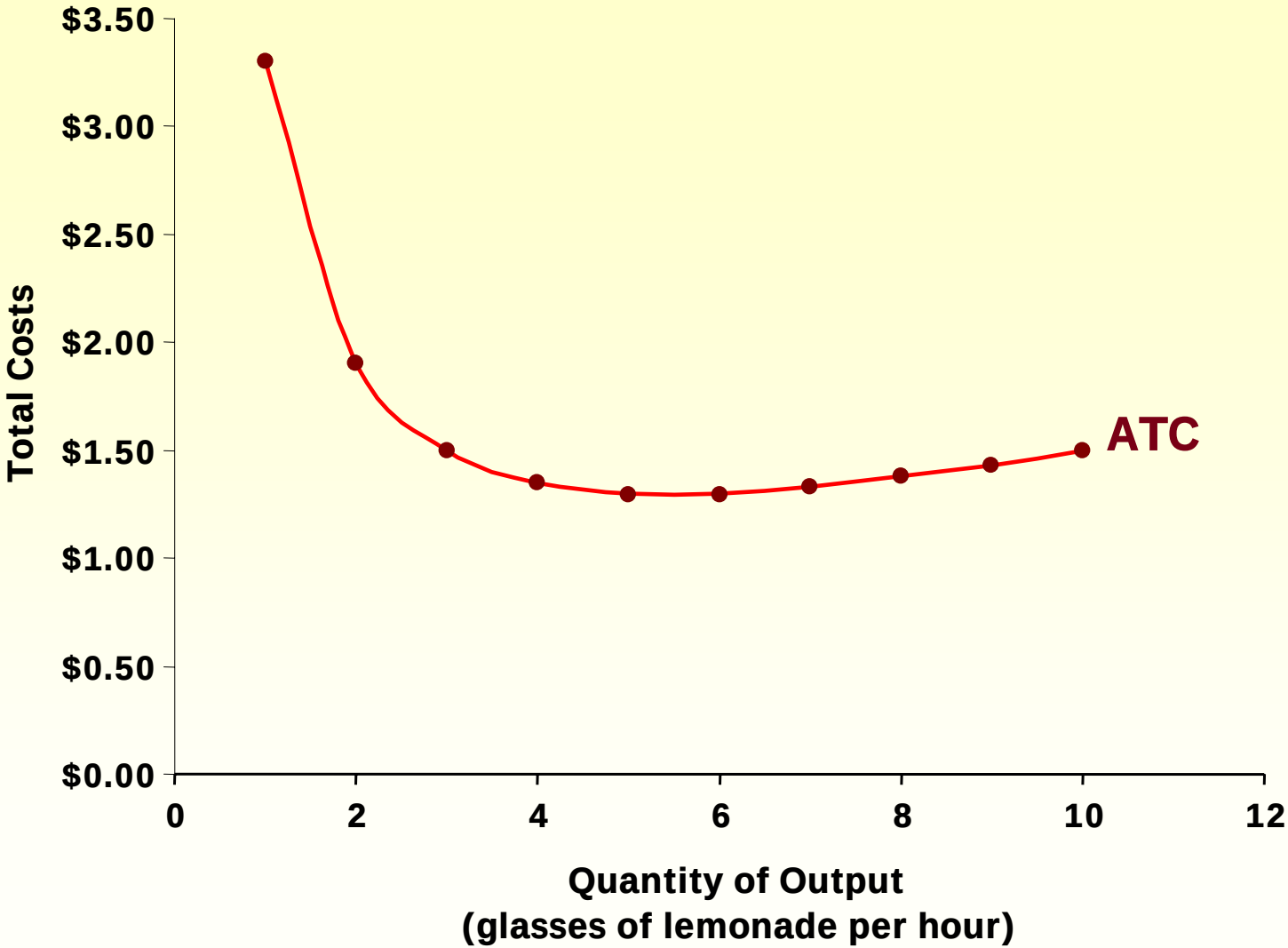
Cost Curves and Their Shapes



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Relationship Between Marginal Cost and Average Total Cost

- Whenever marginal cost is less than average total cost, average total cost is falling.
- Whenever marginal cost is greater than average total cost, average total cost is rising.

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Relationship Between Marginal Cost and Average Total Cost

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

- **Efficient scale is the quantity that minimizes average total cost.**

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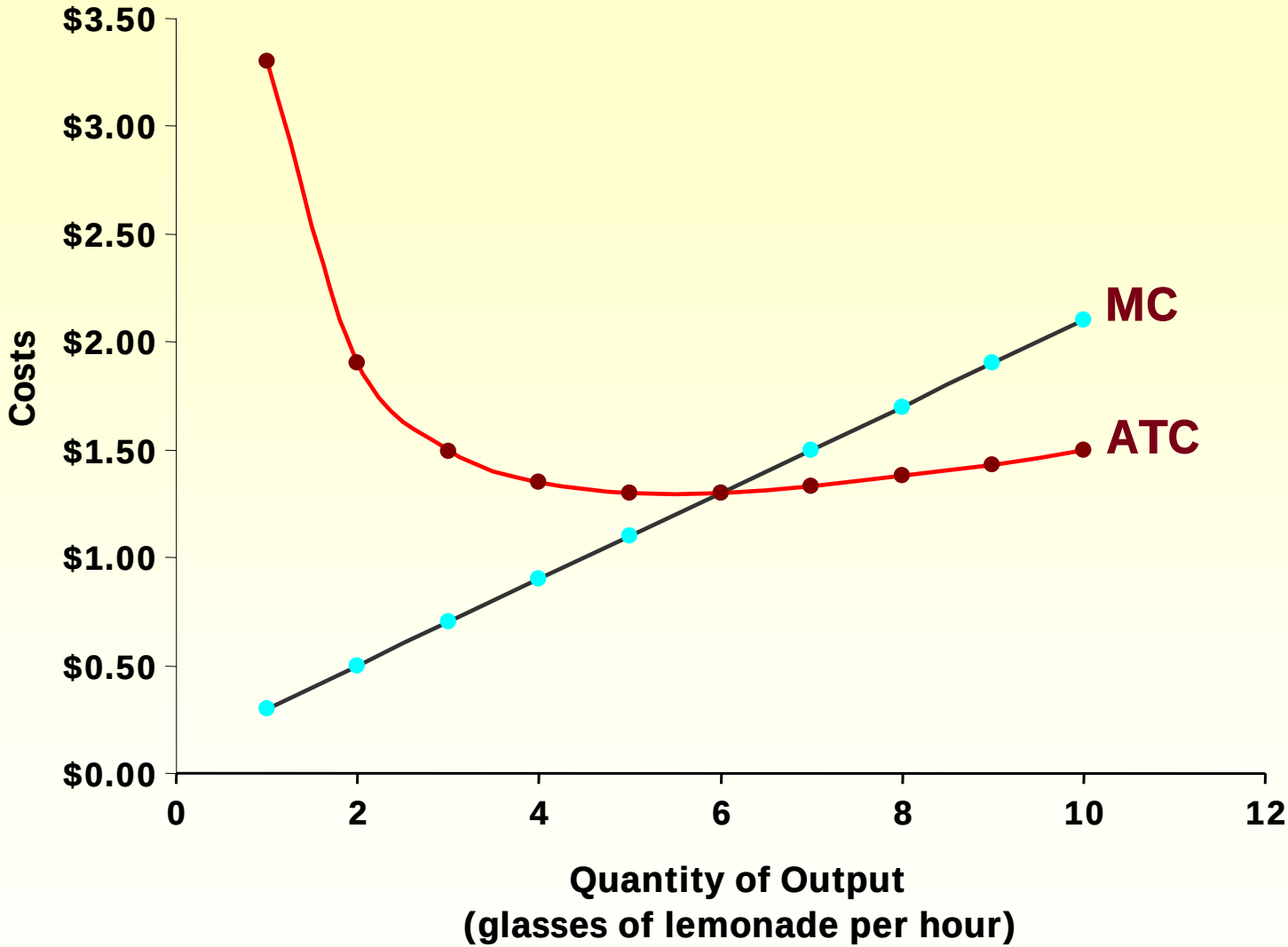
Relationship Between Marginal Cost and Average Total Cost



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The Various Measures of Cost

It is now time to examine the relationships that exist between the different measures of cost.

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The Various Measures of Cost

Big Bob's Bagel Bin

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

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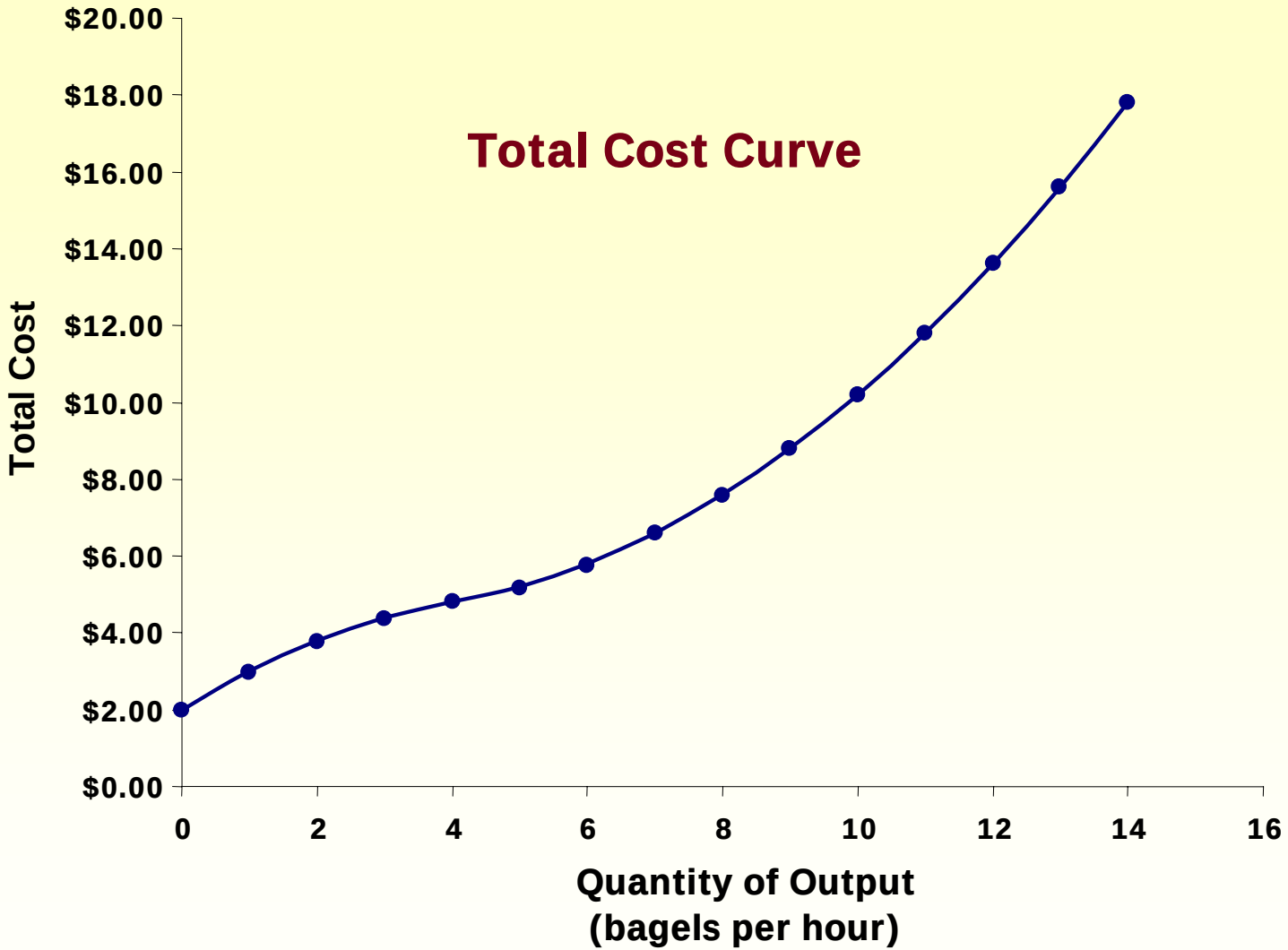
Big Bob's Cost Curves...



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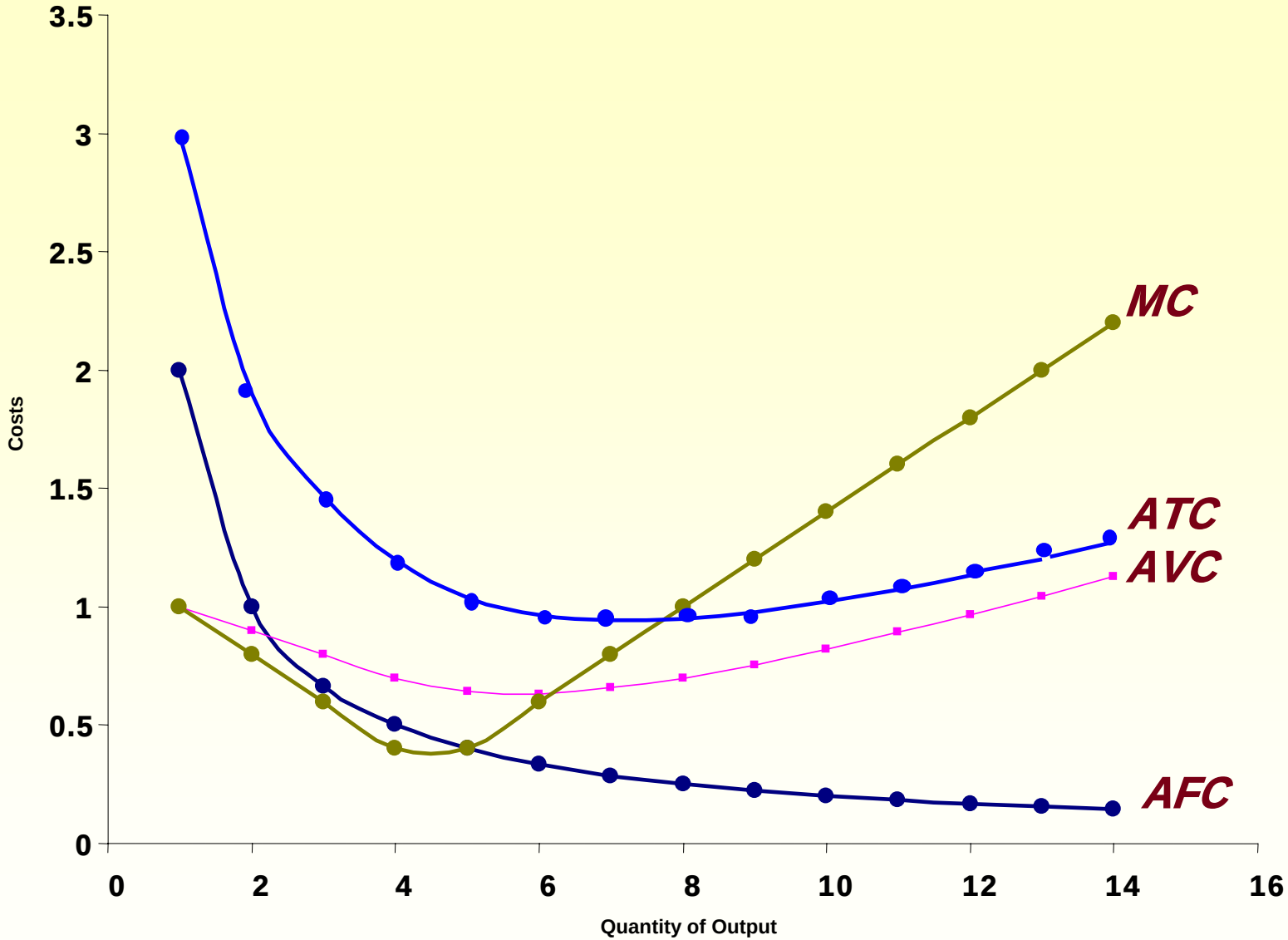
Big Bob's Cost Curves...



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Three Important Properties of Cost Curves

- Marginal cost eventually rises with the quantity of output.
- The average-total-cost curve is U-shaped.
- The marginal-cost curve crosses the average-total-cost curve at the minimum of average total cost.

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Costs in the Long Run

- For many firms, the division of total costs between fixed and variable costs depends on the time horizon being considered.
  - In the short run some costs are fixed.
  - In the long run fixed costs become variable costs.

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Costs in the Long Run

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.

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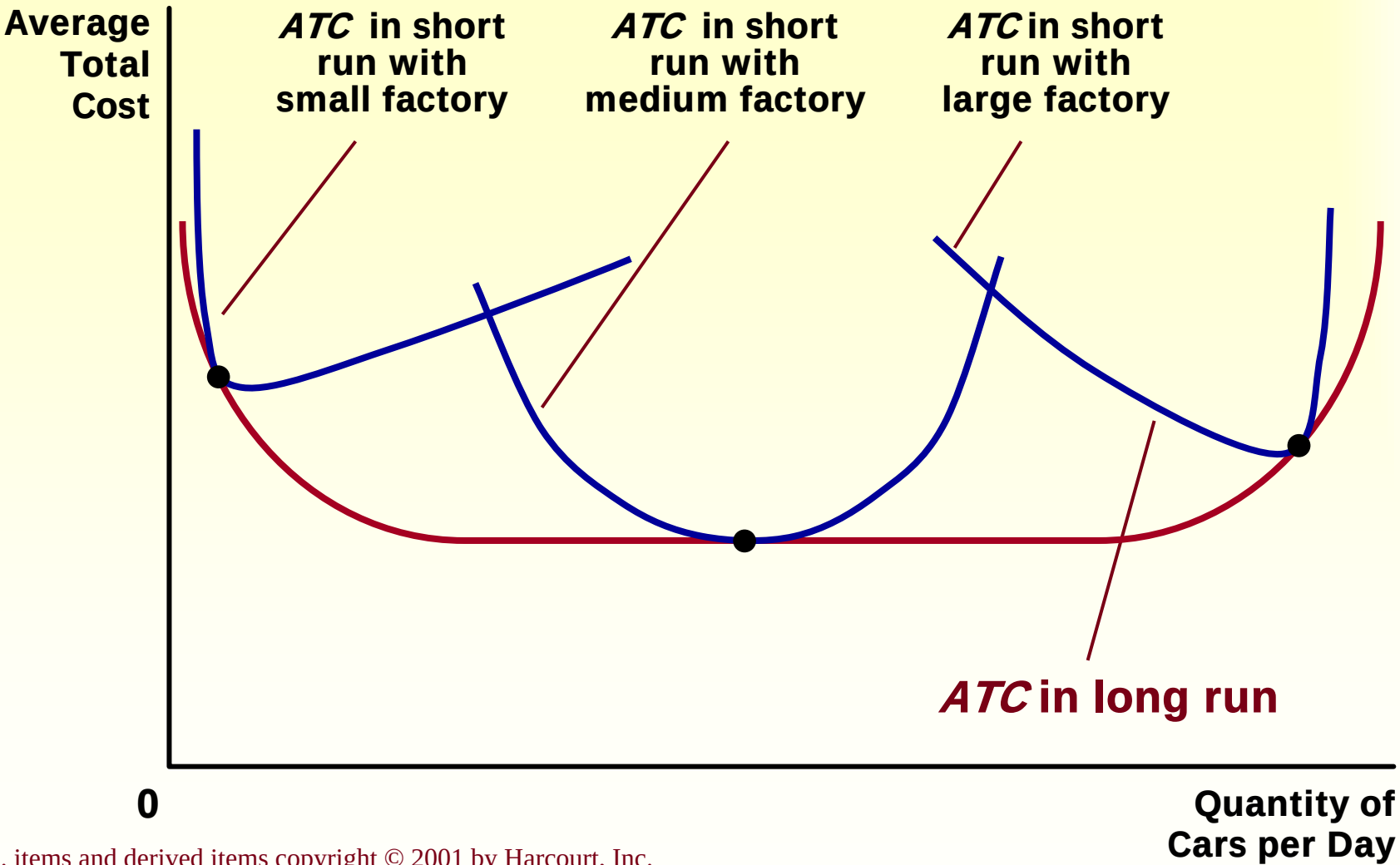
Average Total Cost in the Short and Long Runs...



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Economies and Diseconomies of Scale

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

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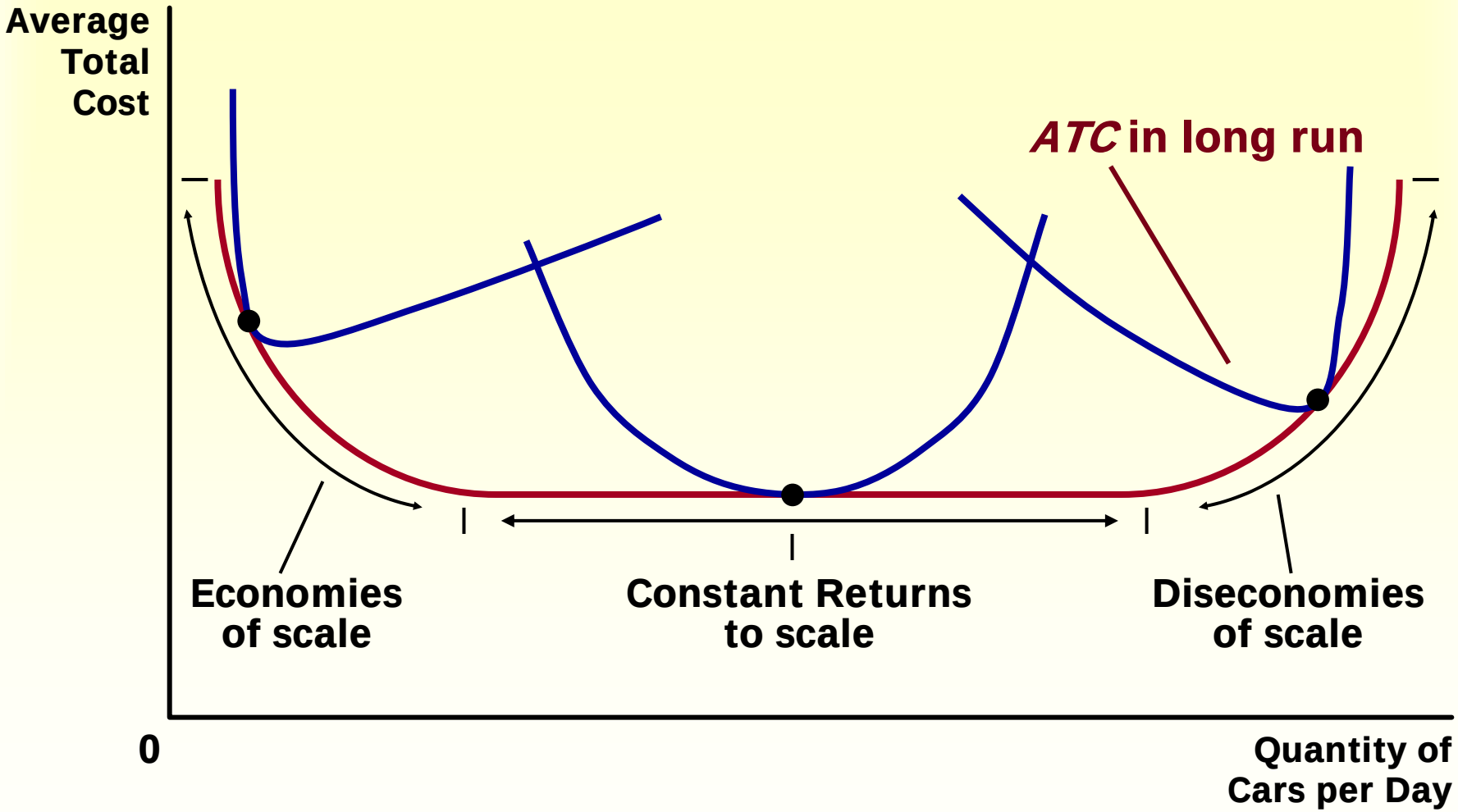
Economies and Diseconomies of Scale



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Summary

- The goal of firms is to maximize profit, which equals total revenue minus total cost.
- When analyzing a firm's behavior, it is important to include all the opportunity costs of production.
- Some opportunity costs are explicit while other opportunity costs are implicit.

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Summary

- A firm's costs reflect its production process.
- A typical firm's production function gets flatter as the quantity of input increases, displaying the property of diminishing marginal product.
- A firm's total costs are divided between fixed and variable costs. Fixed costs don't vary with quantities produced; variable costs do.

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Summary

- Average total cost is total cost divided by the quantity of output.
- Marginal cost is the amount by which total cost would rise if output were increased by one unit.
- The marginal cost always rises with the quantity of output.

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Summary

- The average-total-cost curve is U-shaped.
- The marginal-cost curve always crosses the average-total-cost curve at the minimum of ATC.
- A firm's costs often depend on the time horizon being considered.

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Graphical Review

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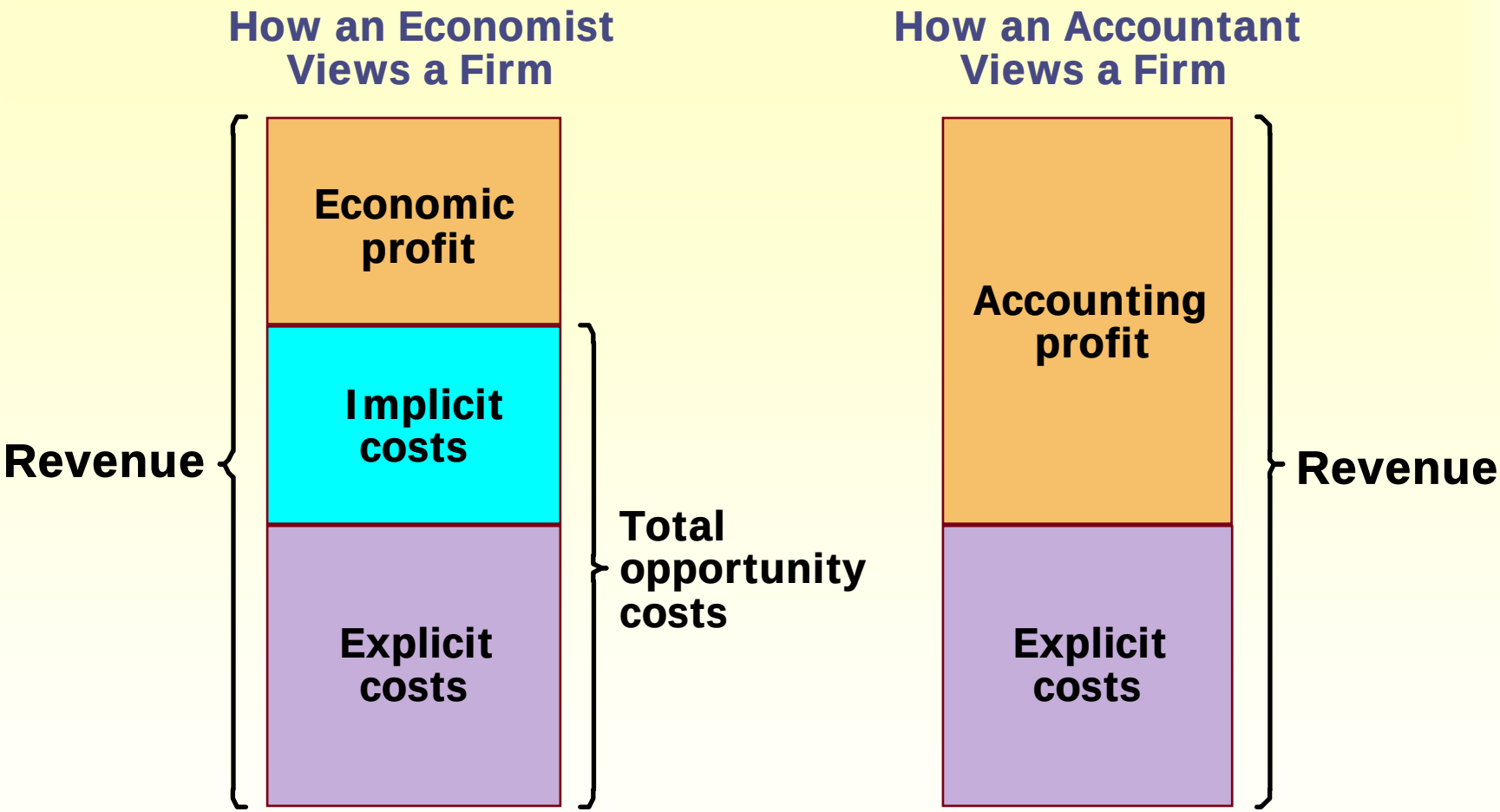
Economic Profit versus Accounting Profit



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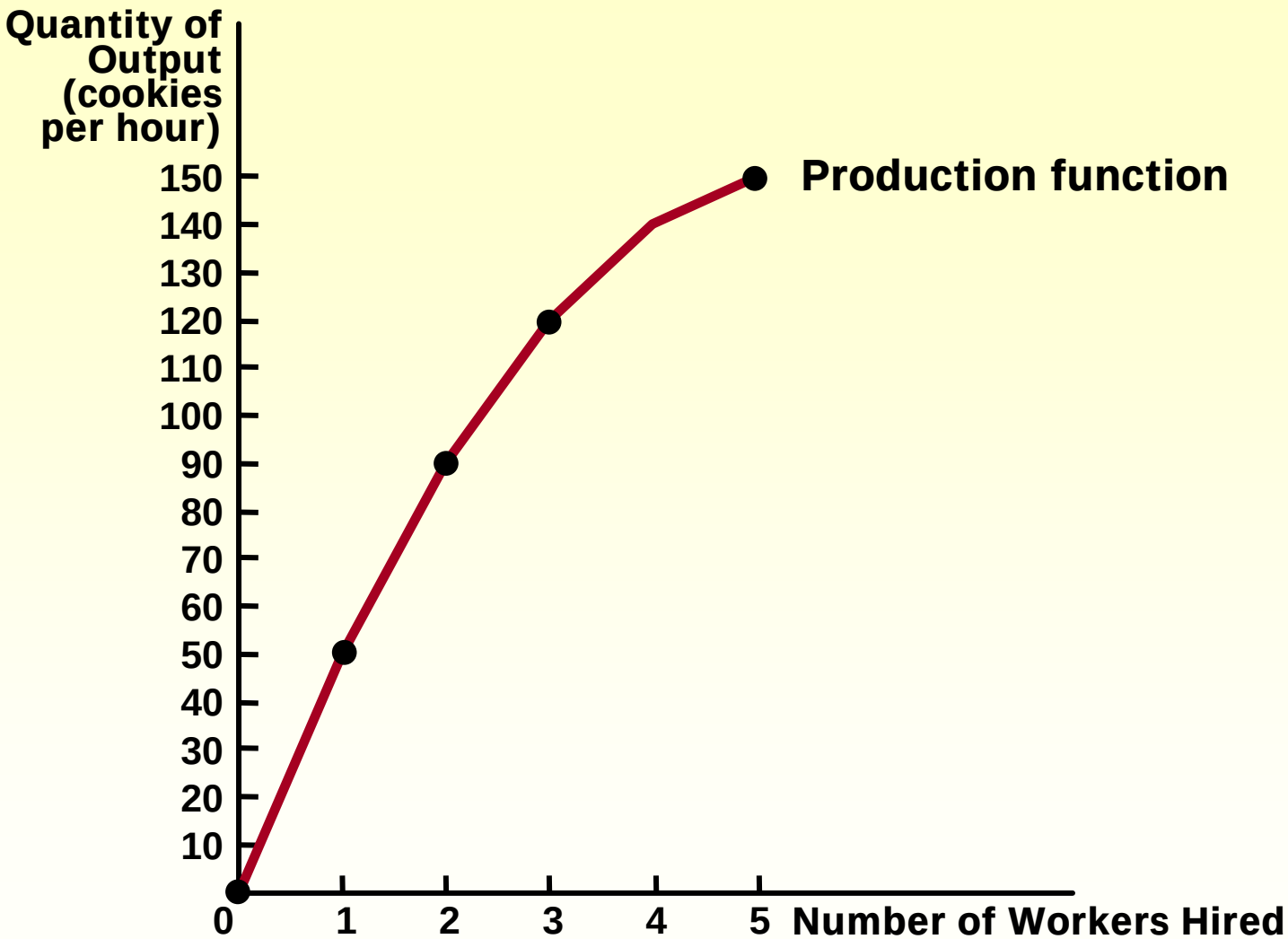
A Production Function...



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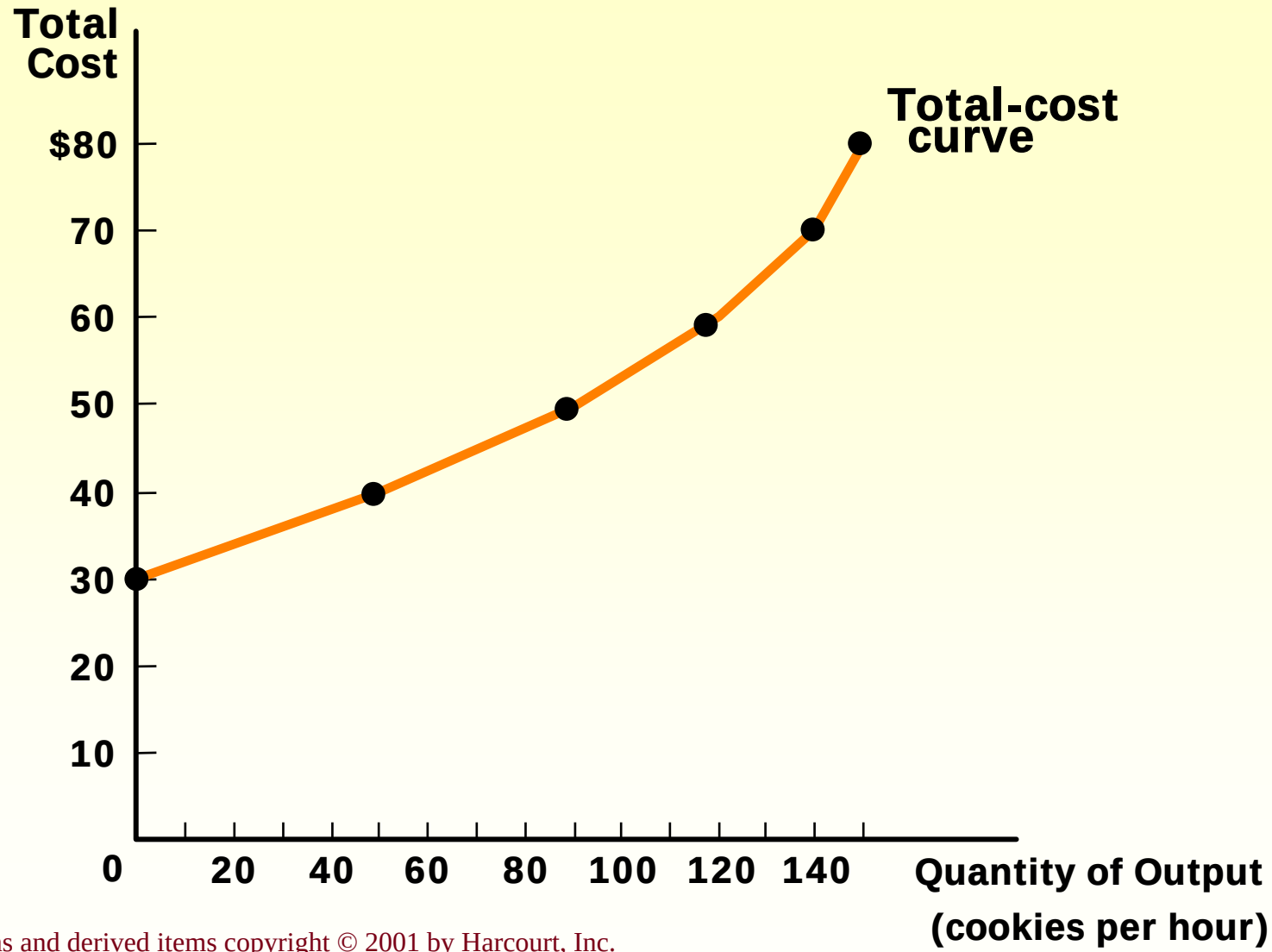
Total-Cost Curve...



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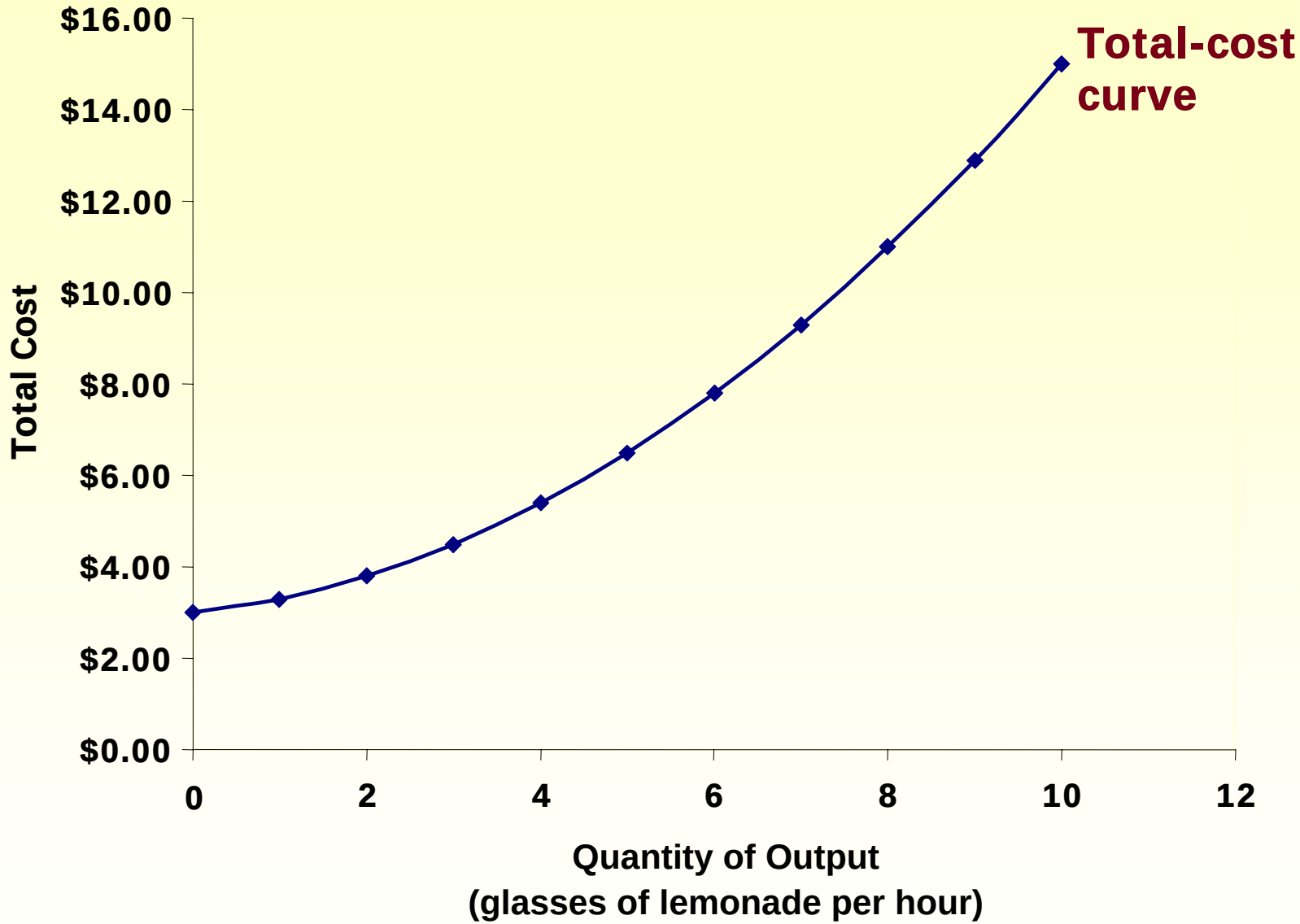
Total-Cost Curve...



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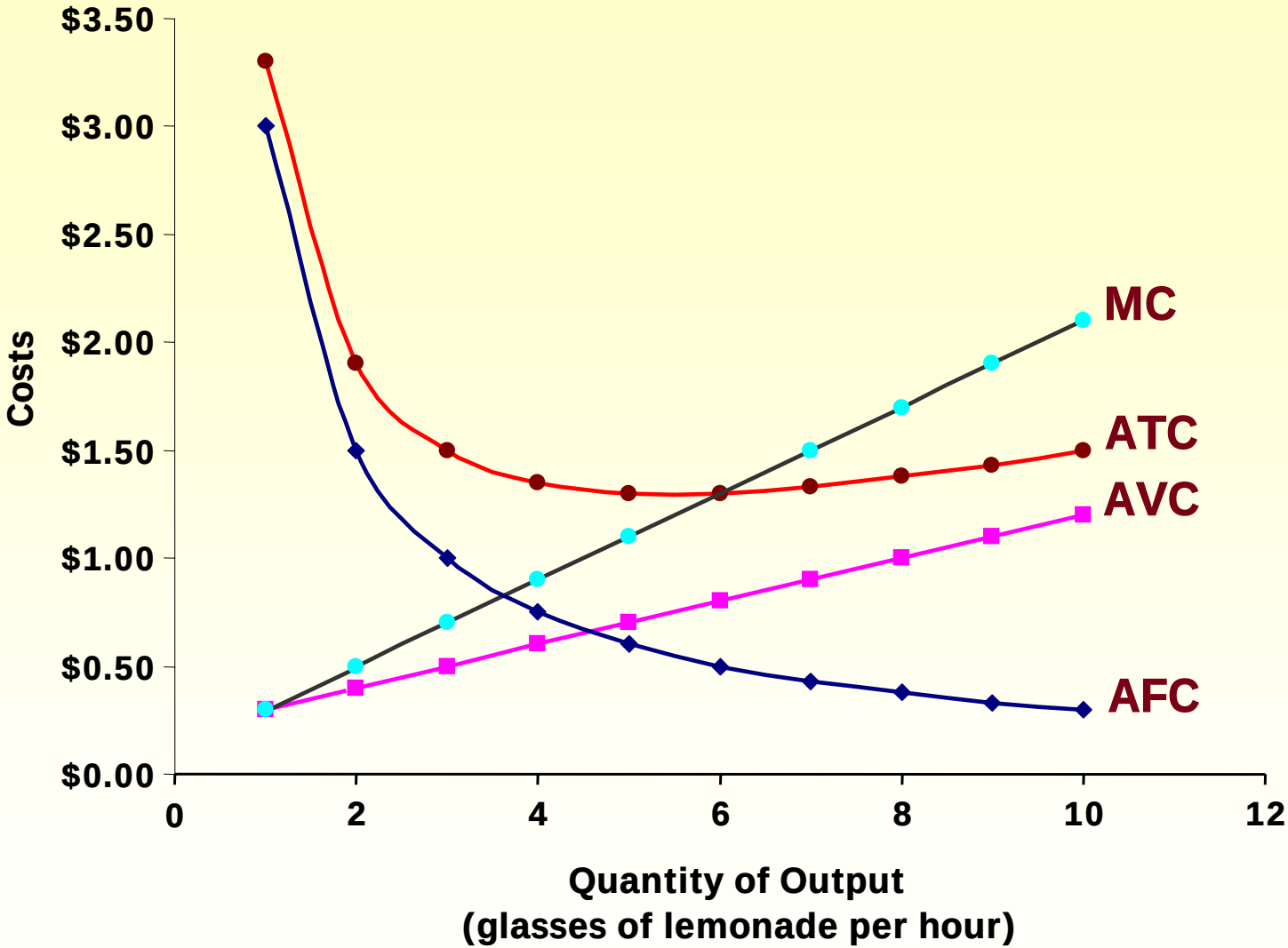
Average-Cost and Marginal-Cost Curves...



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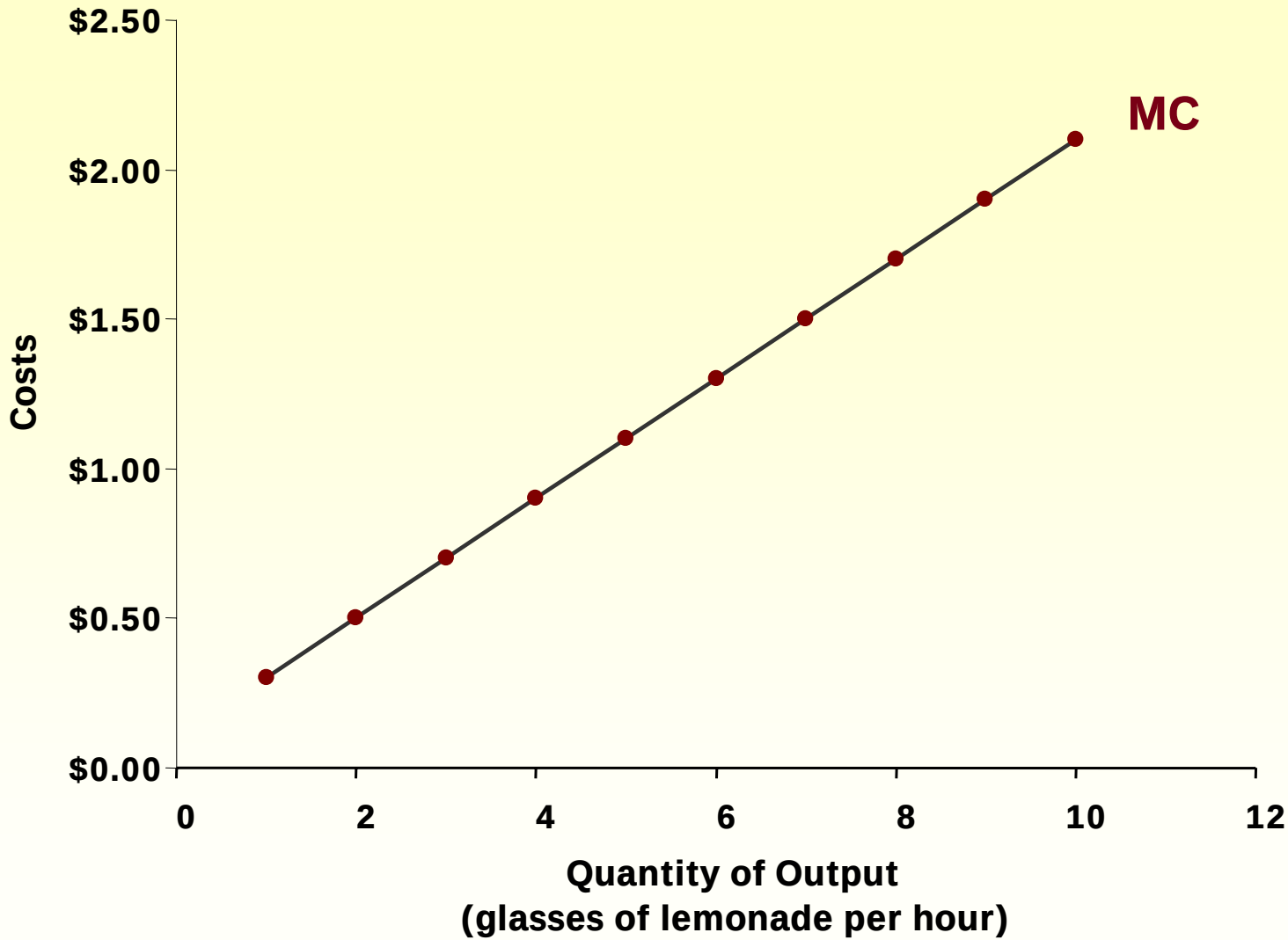
Cost Curves and Their Shapes



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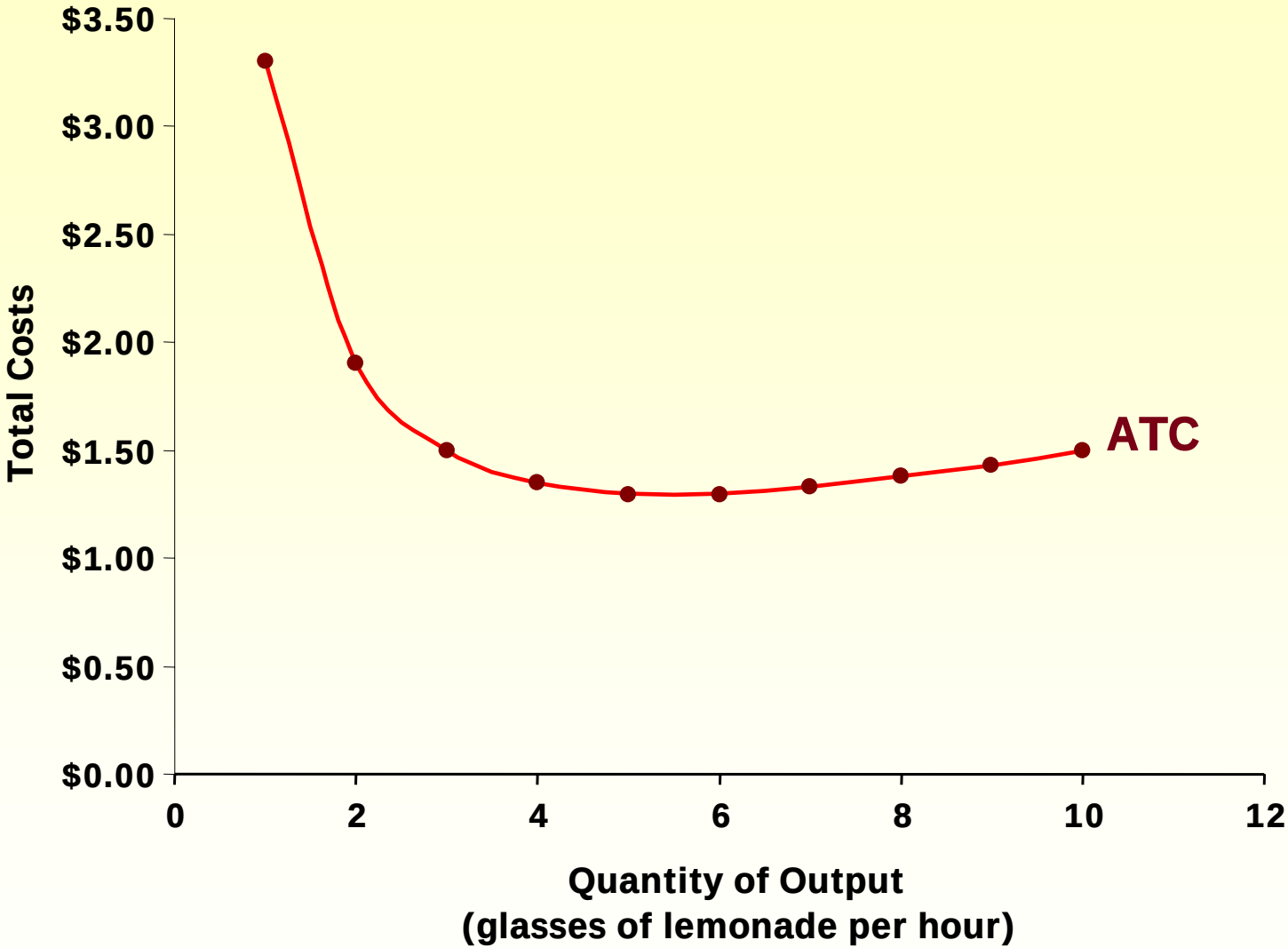
Cost Curves and Their Shapes



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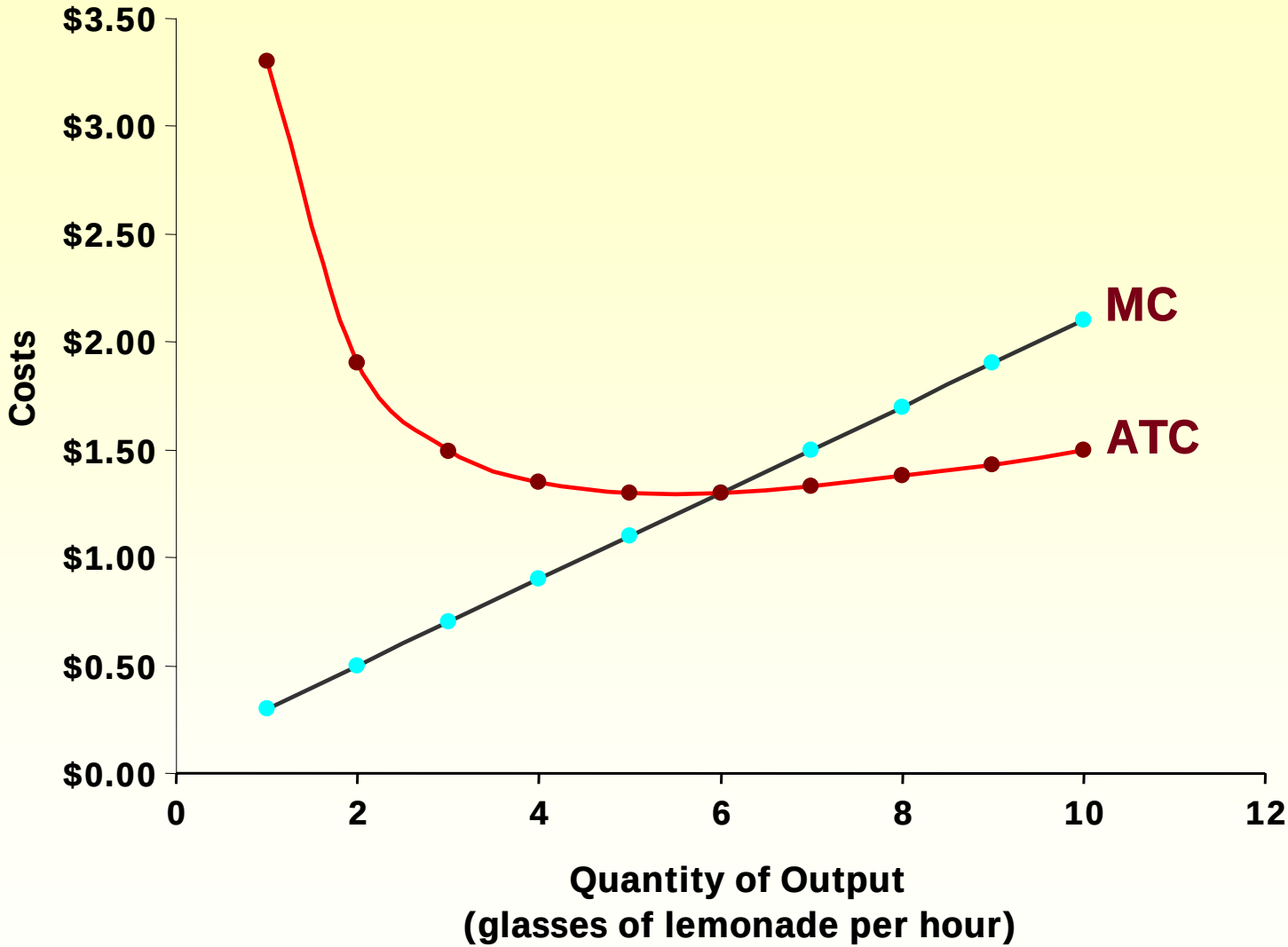
Relationship Between Marginal Cost and Average Total Cost



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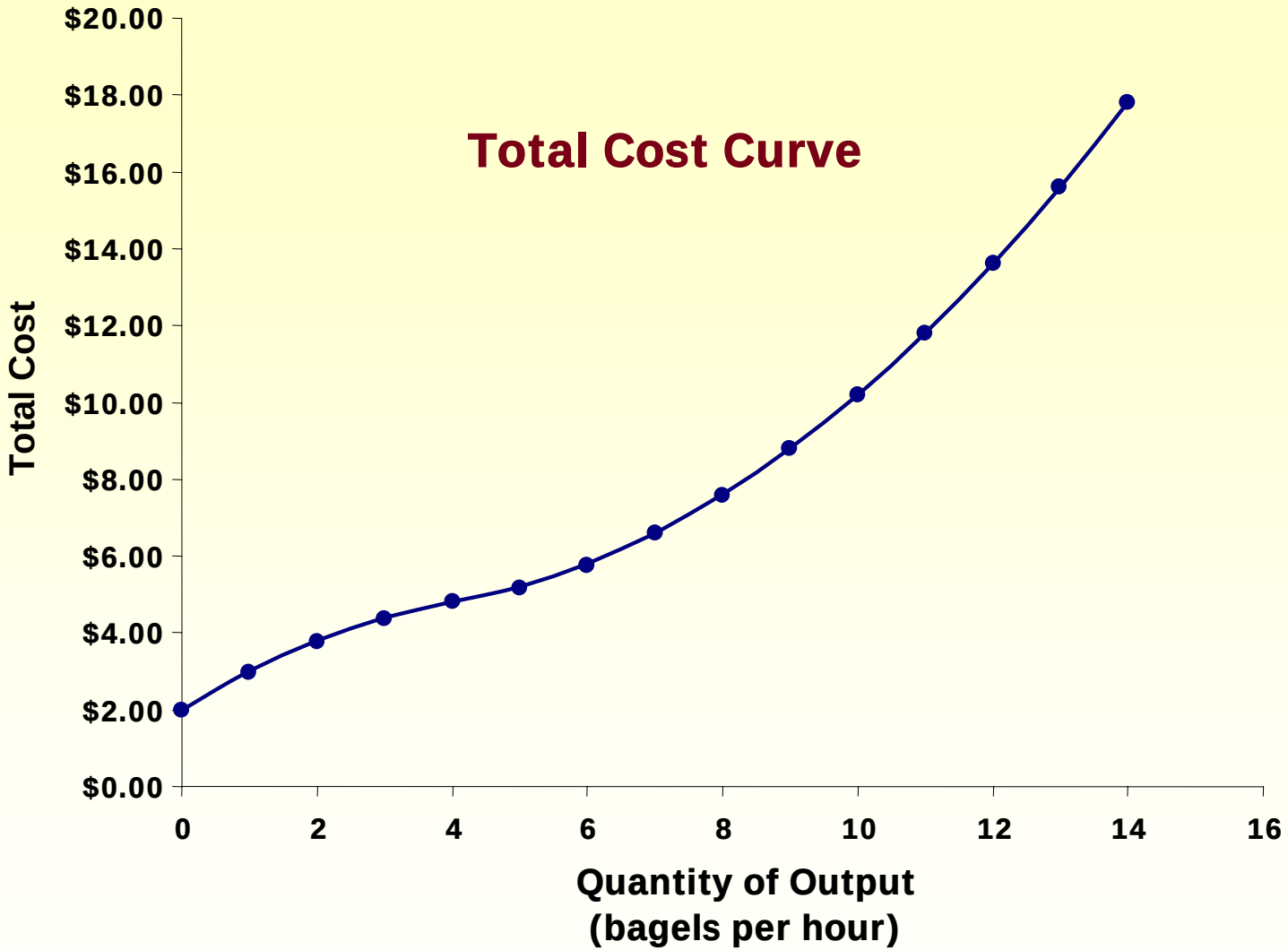
Big Bob's Cost Curves...



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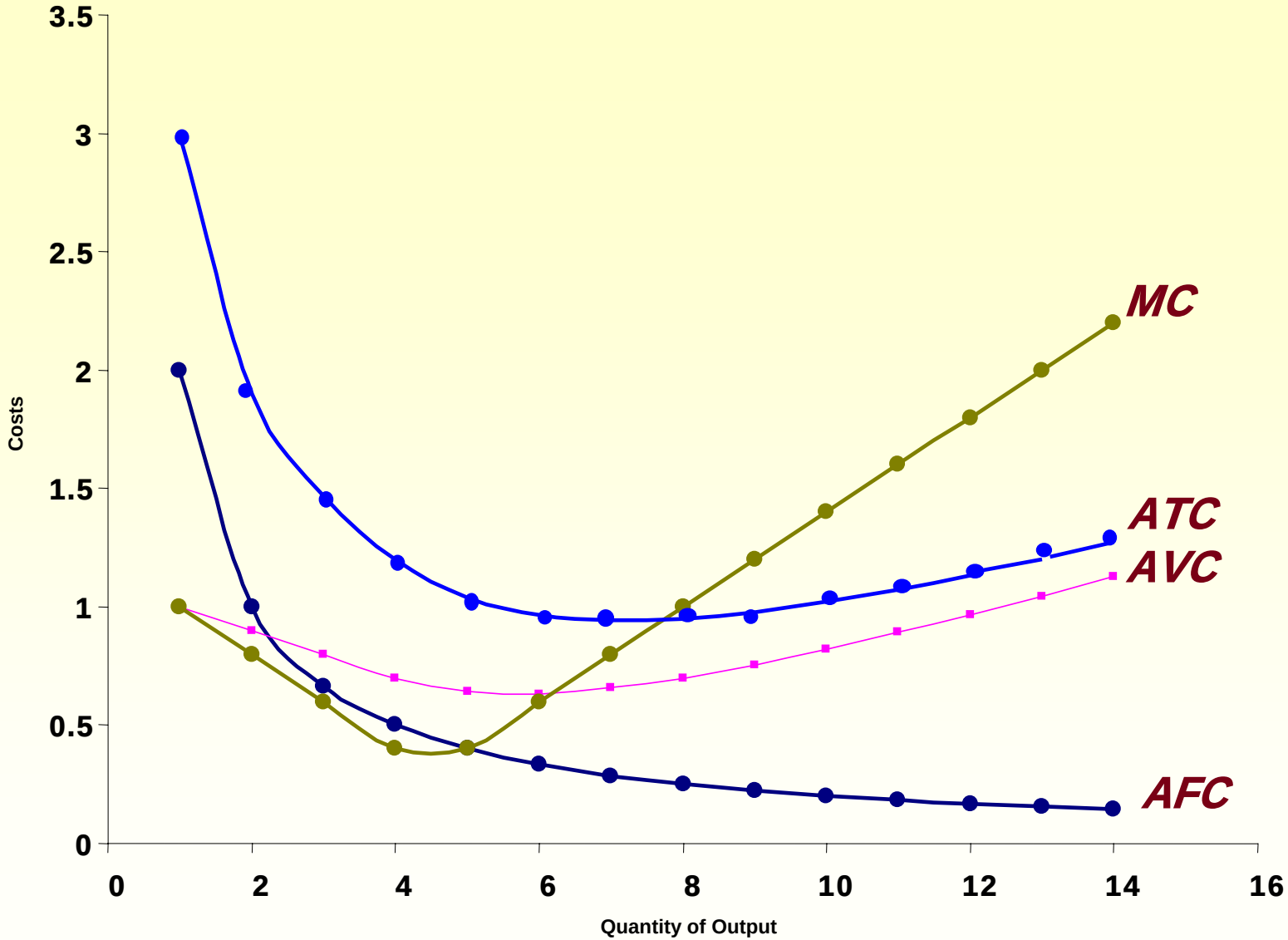
Big Bob's Cost Curves...



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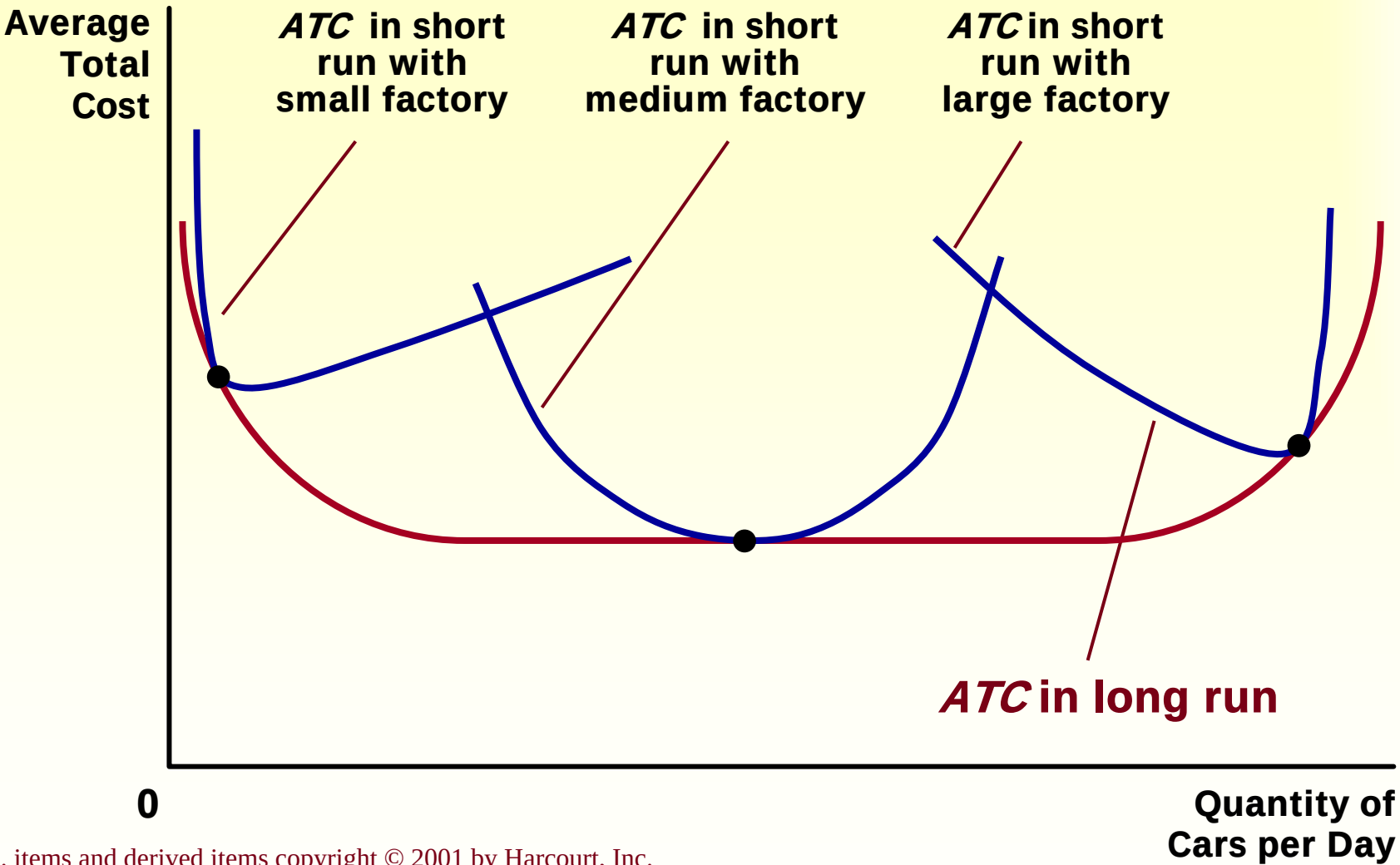
Average Total Cost in the Short and Long Runs...



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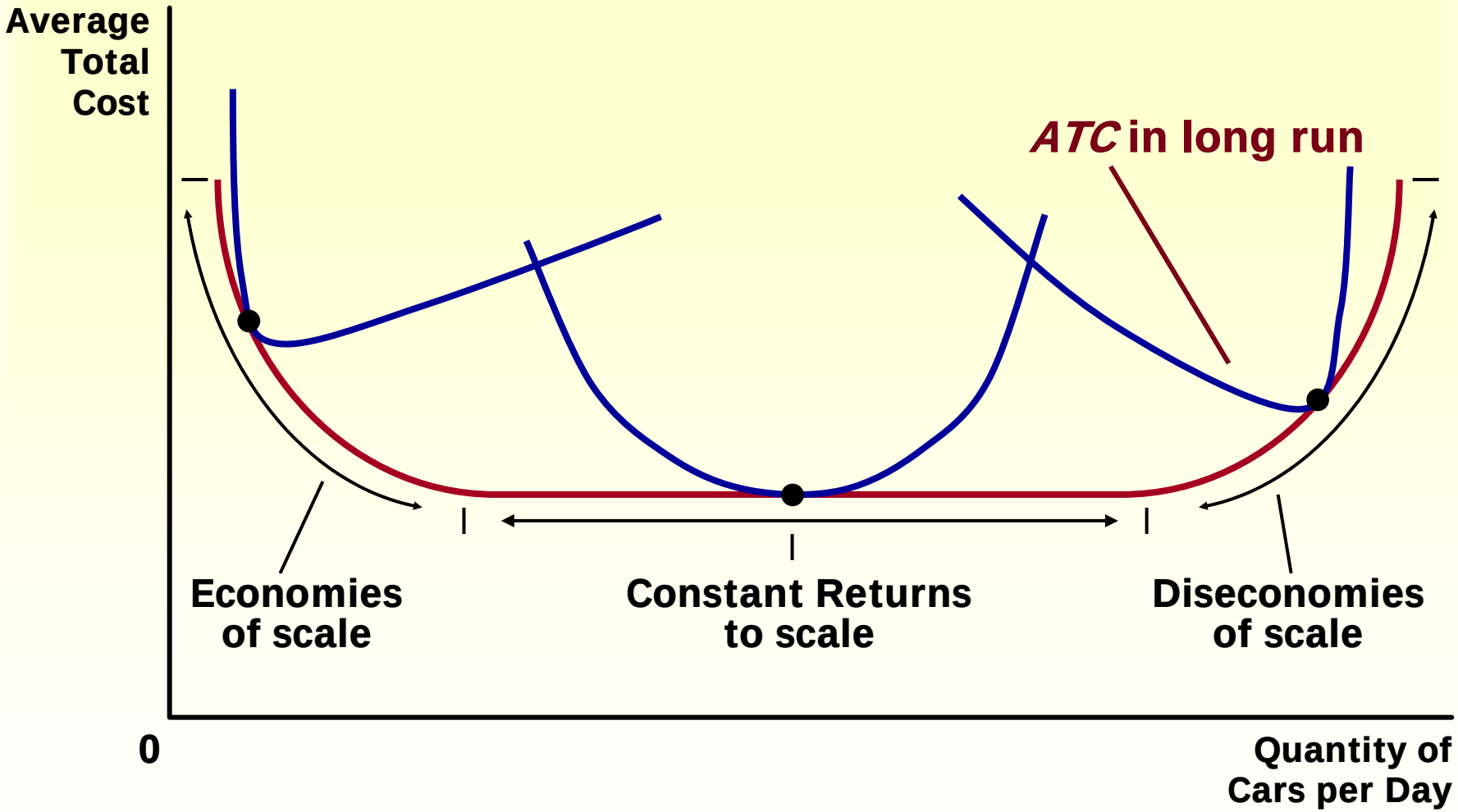
Economies and Diseconomies of Scale



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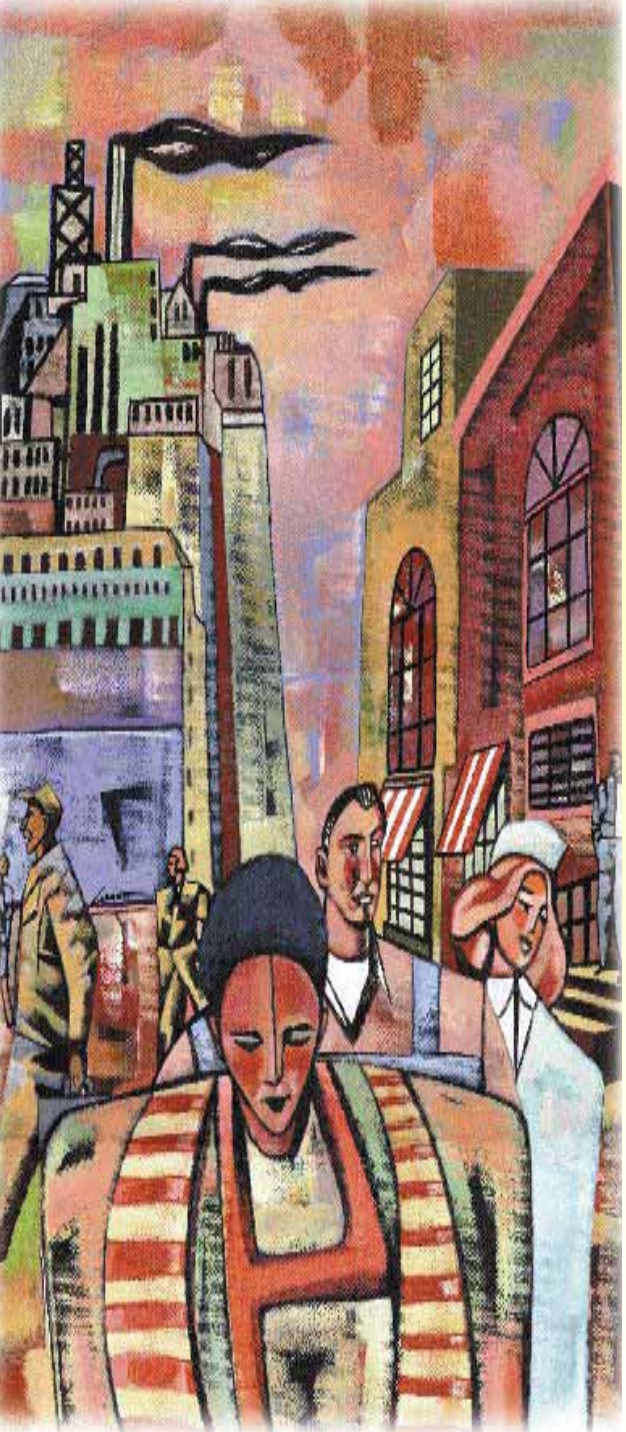

Firms in Competitive Markets

Chapter 14

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The Meaning of Competition

- A **perfectly competitive market** has the following characteristics:
  - There are many buyers and sellers in the market.
  - The goods offered by the various sellers are largely the same.
  - Firms can freely enter or exit the market.

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The Meaning of Competition

- As a result of its characteristics, the **perfectly competitive market** has the following outcomes:
  - The actions of any single buyer or seller in the market have a negligible impact on the market price.
  - Each buyer and seller takes the market price as given.

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The Meaning of Competition

Buyers and sellers in competitive markets are said to be price takers.

Buyers and sellers must accept the price determined by the market.

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Revenue of a Competitive Firm

Total revenue for a firm is the *selling price* times the *quantity sold*.

$$TR = (P \times Q)$$

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Revenue of a Competitive Firm

Total revenue is proportional to the amount of output.

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Revenue of a Competitive Firm

Average revenue tells us how much revenue a firm receives for the typical unit sold.

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Revenue of a Competitive Firm

In perfect competition, average revenue equals the price of the good.

$$\text{Average revenue} = \frac{\text{Total revenue}}{\text{Quantity}}$$

$$= \frac{(\text{Price} \times \text{Quantity})}{\text{Quantity}}$$

$$= \text{Price}$$

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Revenue of a Competitive Firm

Marginal revenue is the change in total revenue from an additional unit sold.

$$MR = \Delta TR / \Delta Q$$

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Revenue of a Competitive Firm

For competitive firms, marginal revenue equals the price of the good.

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Total, Average, and Marginal Revenue for a Competitive Firm

Quantity (Q)	Price (P)	Total Revenue (TR = PxQ)	Average Revenue (AR = TR / Q)	Marginal Revenue (MR = $\Delta TR / \Delta Q$)
1	$6.00	$6.00	$6.00	
2	$6.00	$12.00	$6.00	$6.00
3	$6.00	$18.00	$6.00	$6.00
4	$6.00	$24.00	$6.00	$6.00
5	$6.00	$30.00	$6.00	$6.00
6	$6.00	$36.00	$6.00	$6.00
7	$6.00	$42.00	$6.00	$6.00
8	$6.00	$48.00	$6.00	$6.00

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Profit Maximization for the Competitive Firm

- The goal of a competitive firm is to **maximize profit.**
- This means that the firm will want to produce the quantity that maximizes the *difference between total revenue and total cost.*

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Profit Maximization: A Numerical Example

Price (P)	Quantity (Q)	Total Revenue (TR = PxQ)	Total Cost (TC)	Profit (TR-TC)	Marginal Revenue (MR = $\Delta TR / \Delta Q$)	Marginal Cost MC = $\Delta TC / \Delta Q$
	0	$0.00	$3.00	-$3.00		
$6.00	1	$6.00	$5.00	$1.00	$6.00	$2.00
$6.00	2	$12.00	$8.00	$4.00	$6.00	$3.00
$6.00	3	$18.00	$12.00	$6.00	$6.00	$4.00
$6.00	4	$24.00	$17.00	$7.00	$6.00	$5.00
$6.00	5	$30.00	$23.00	$7.00	$6.00	$6.00
$6.00	6	$36.00	$30.00	$6.00	$6.00	$7.00
$6.00	7	$42.00	$38.00	$4.00	$6.00	$8.00
$6.00	8	$48.00	$47.00	$1.00	$6.00	$9.00

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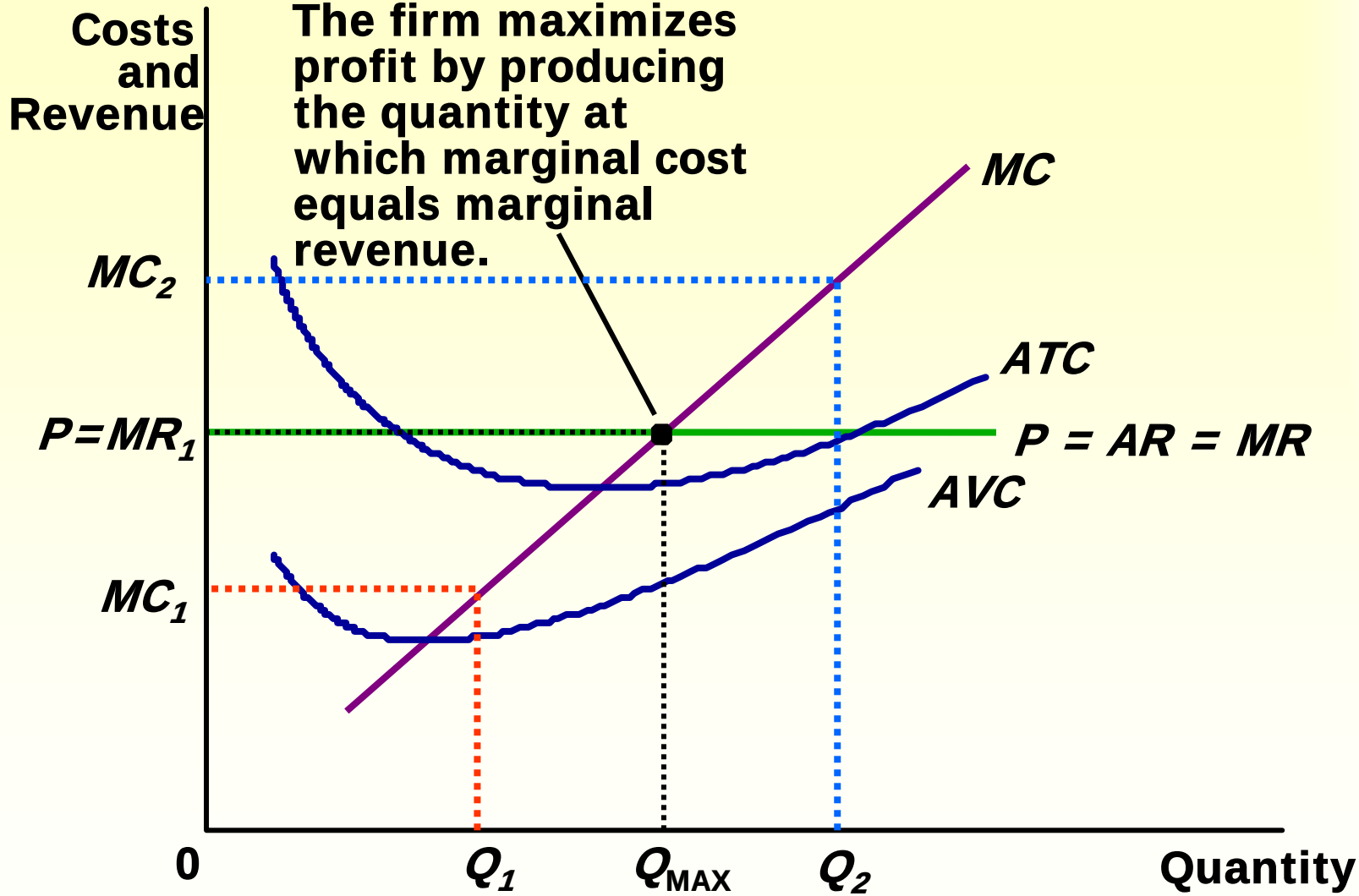
Profit Maximization for the Competitive Firm...



Profit Maximization for the Competitive Firm

Profit maximization occurs at the quantity where marginal revenue equals marginal cost.

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Profit Maximization for the Competitive Firm

When MR > MC ⬇ increase Q

When MR < MC ⬇ decrease Q

When MR = MC ⬇ Profit is maximized.

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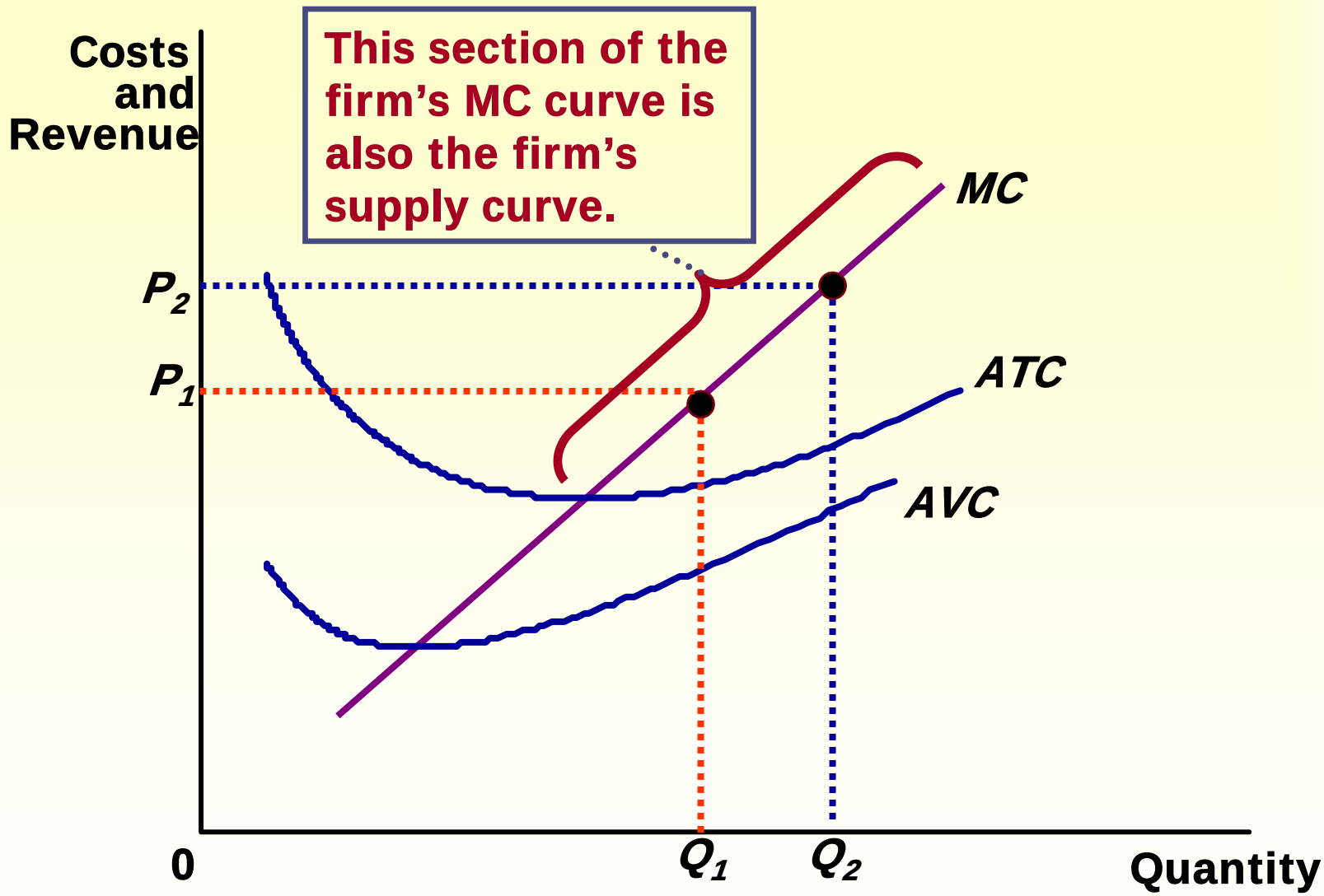
The Marginal-Cost Curve and the Firm's Supply Decision...



The Firm's Short-Run Decision to Shut Down

- A **shutdown** refers to a short-run decision not to produce anything during a specific period of time because of current market conditions.
- **Exit** refers to a long-run decision to leave the market.

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The Firm's Short-Run Decision to Shut Down

The firm considers its sunk costs when deciding to exit, but ignores them when deciding whether to shut down.

- **Sunk costs are costs that have already been committed and cannot be recovered.**

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The Firm's Short-Run Decision to Shut Down

- The firm shuts down if the revenue it gets from producing is less than the variable cost of production.

Shut down if TR < VC

Shut down if TR/Q < VC/Q

Shut down if P < AVC

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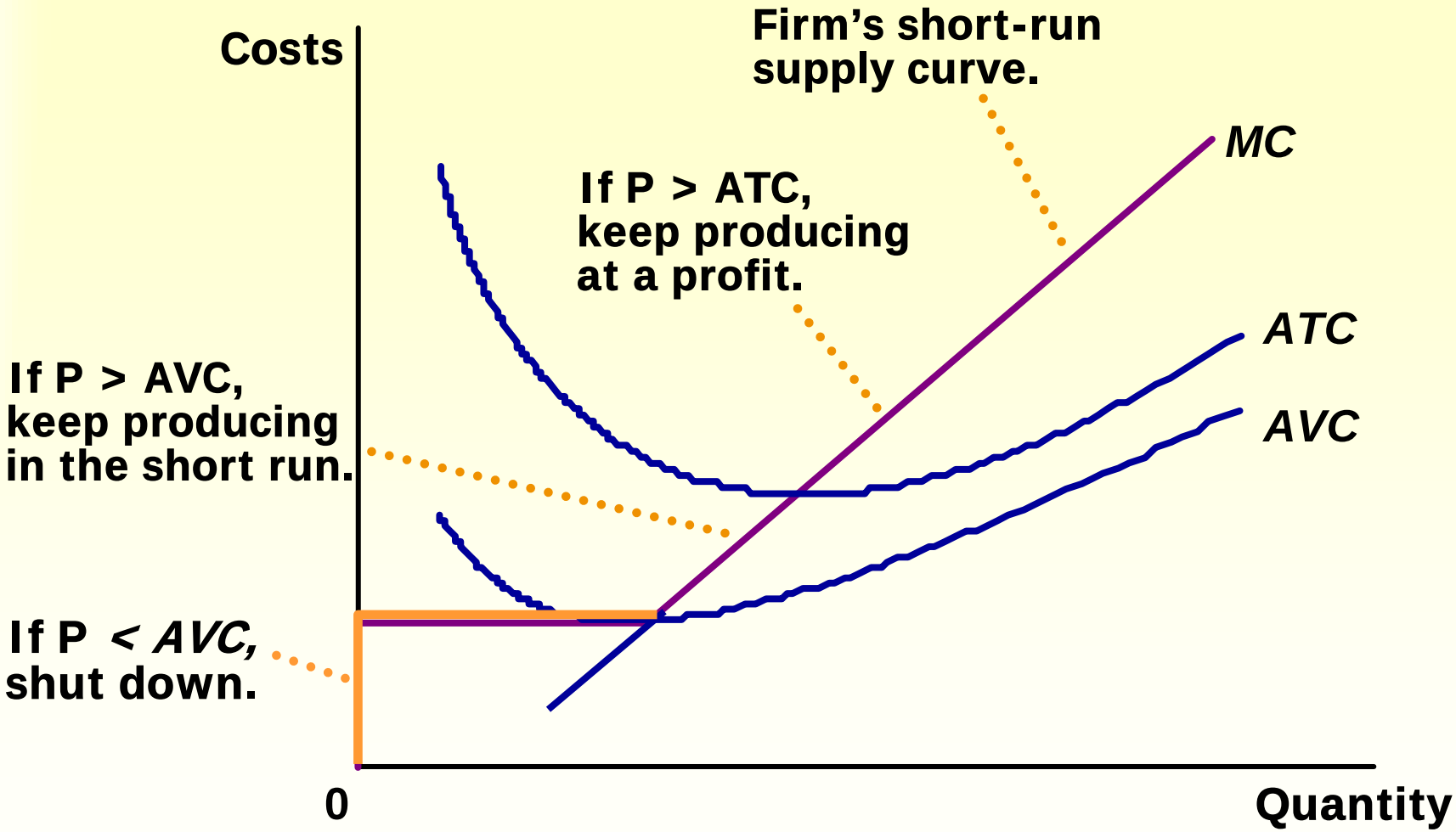
The Firm's Short-Run Decision to Shut Down...



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The Firm's Short-Run Decision to Shut Down

The portion of the marginal-cost curve that lies above average variable cost is the competitive firm's short-run supply curve.

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The Firm's Long-Run Decision to Exit or Enter a Market

- In the long-run, the firm exits if the revenue it would get from producing is less than its total cost.

Exit if TR < TC

Exit if TR/Q < TC/Q

Exit if P < ATC

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The Firm's Long-Run Decision to Exit or Enter a Market

- A firm will enter the industry if such an action would be profitable.

Enter if TR > TC

Enter if TR/Q > TC/Q

Enter if P > ATC

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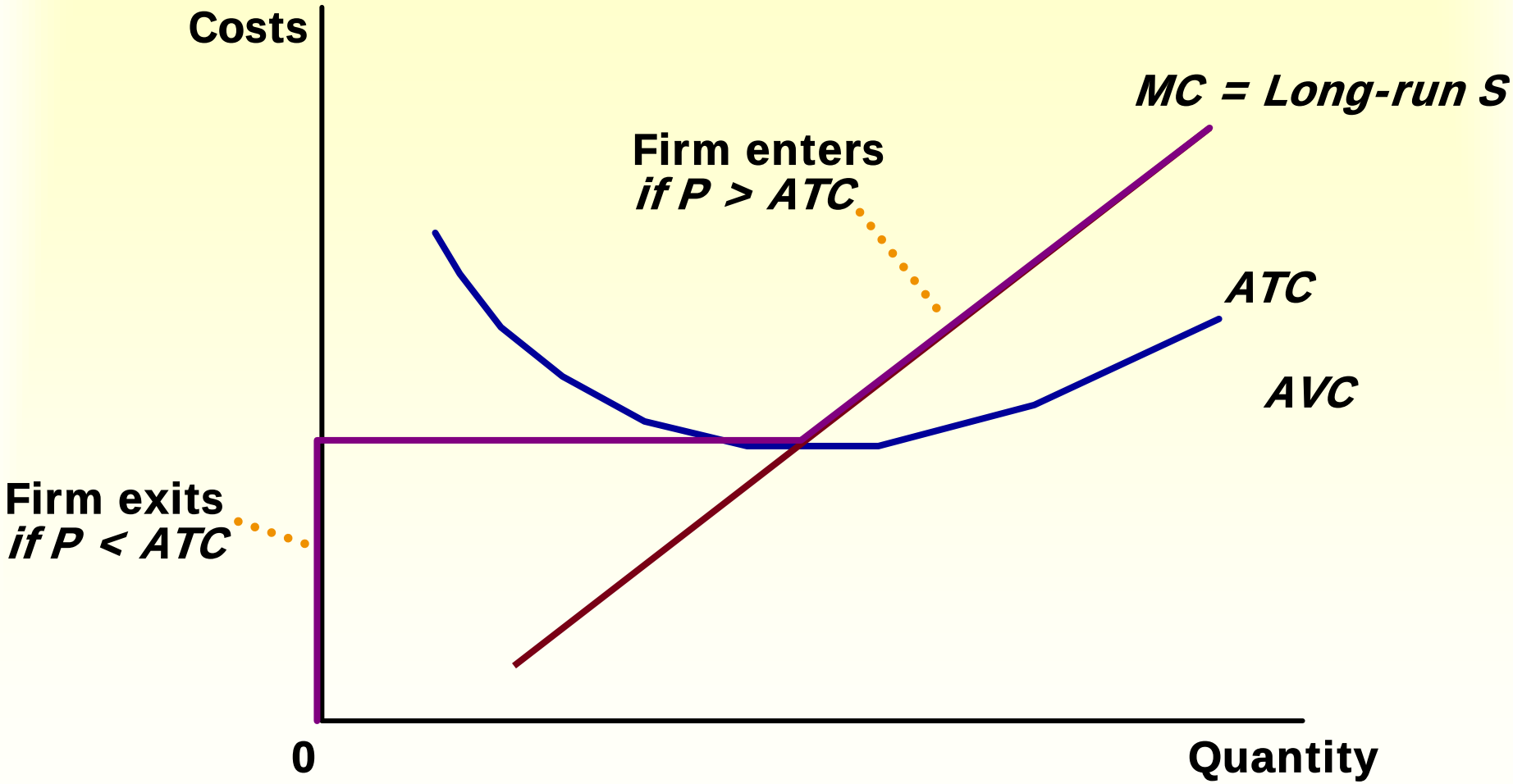
The Competitive Firm's Long-Run Supply Curve...



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The Competitive Firm's Long-Run Supply Curve

The competitive firm's long-run supply curve is the portion of its marginal-cost curve that lies above average total cost.

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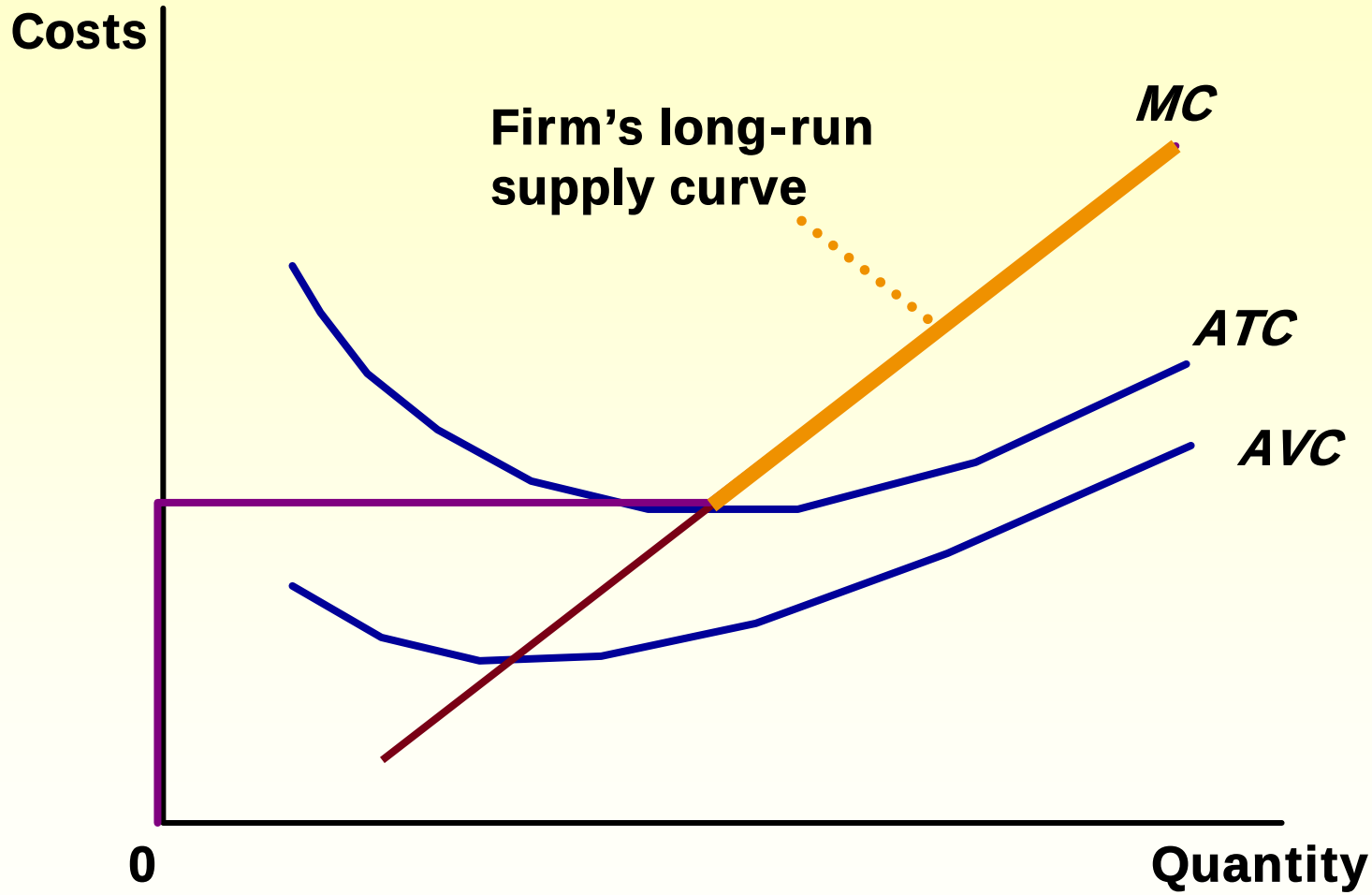
The Competitive Firm's Long-Run Supply Curve...



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The Firm's Short-Run and Long-Run Supply Curves

- **Short-Run Supply Curve**
  - The portion of its marginal cost curve that lies above average variable cost.
- **Long-Run Supply Curve**
  - The marginal cost curve above the minimum point of its average total cost curve.

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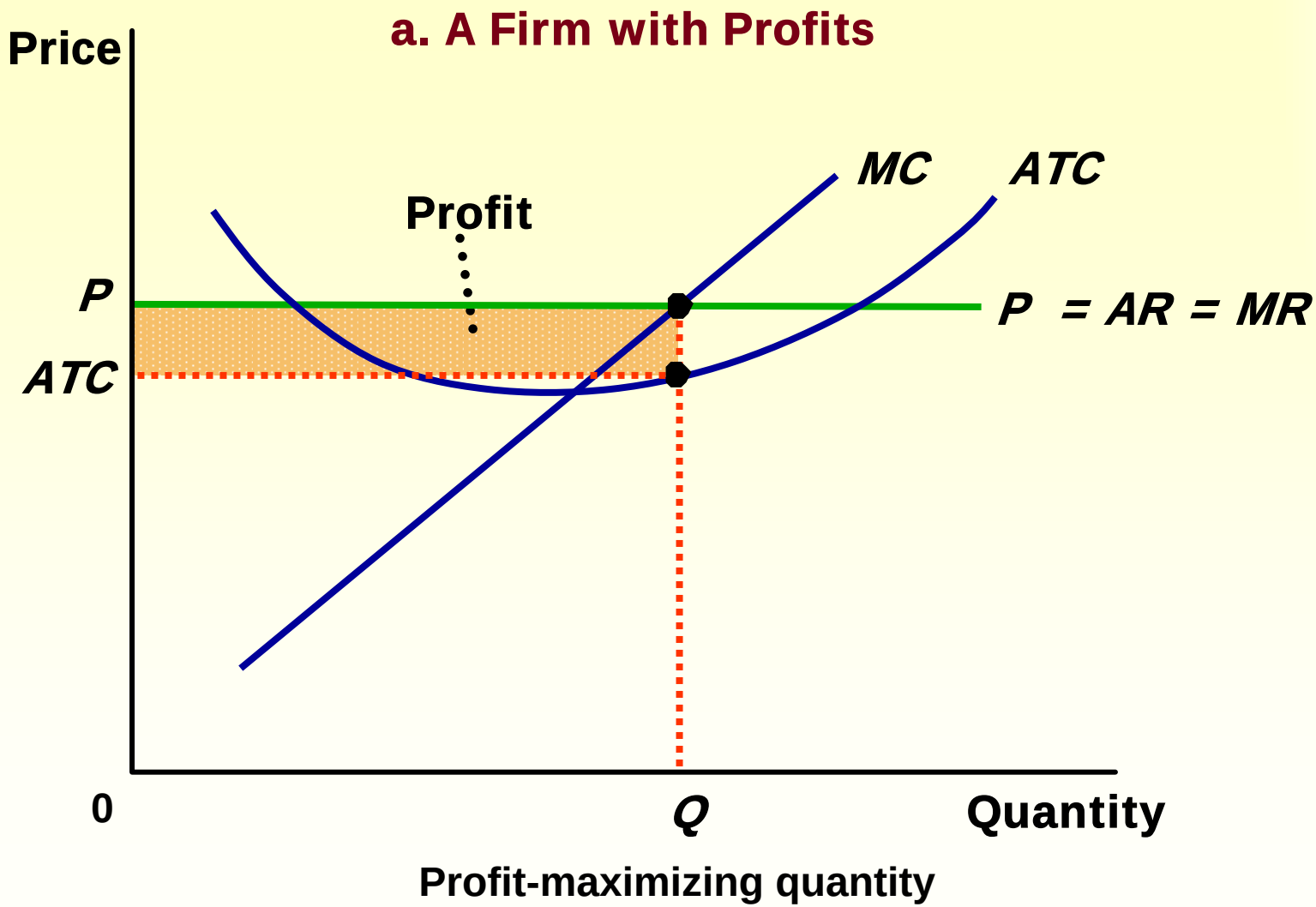
Measuring Profit in the Graph for the Competitive Firm...



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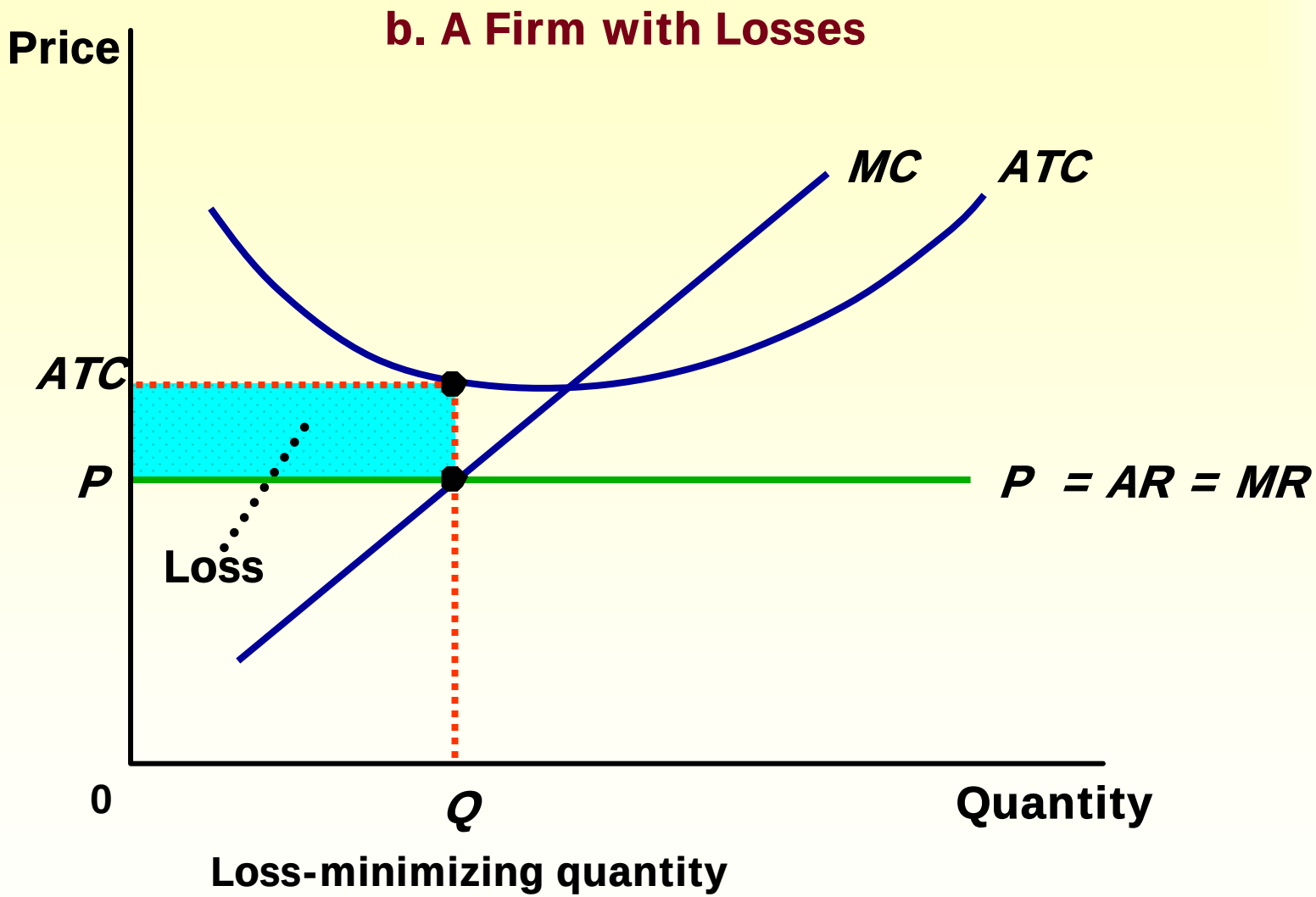
Measuring Profit in the Graph for the Competitive Firm...



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Supply in a Competitive Market

Market supply equals the sum of the quantities supplied by the individual firms in the market.

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The Short Run: Market Supply with a Fixed Number of Firms

- For any given price, each firm supplies a quantity of output so that its marginal cost equals price.
- The market supply curve reflects the individual firms' marginal cost curves.

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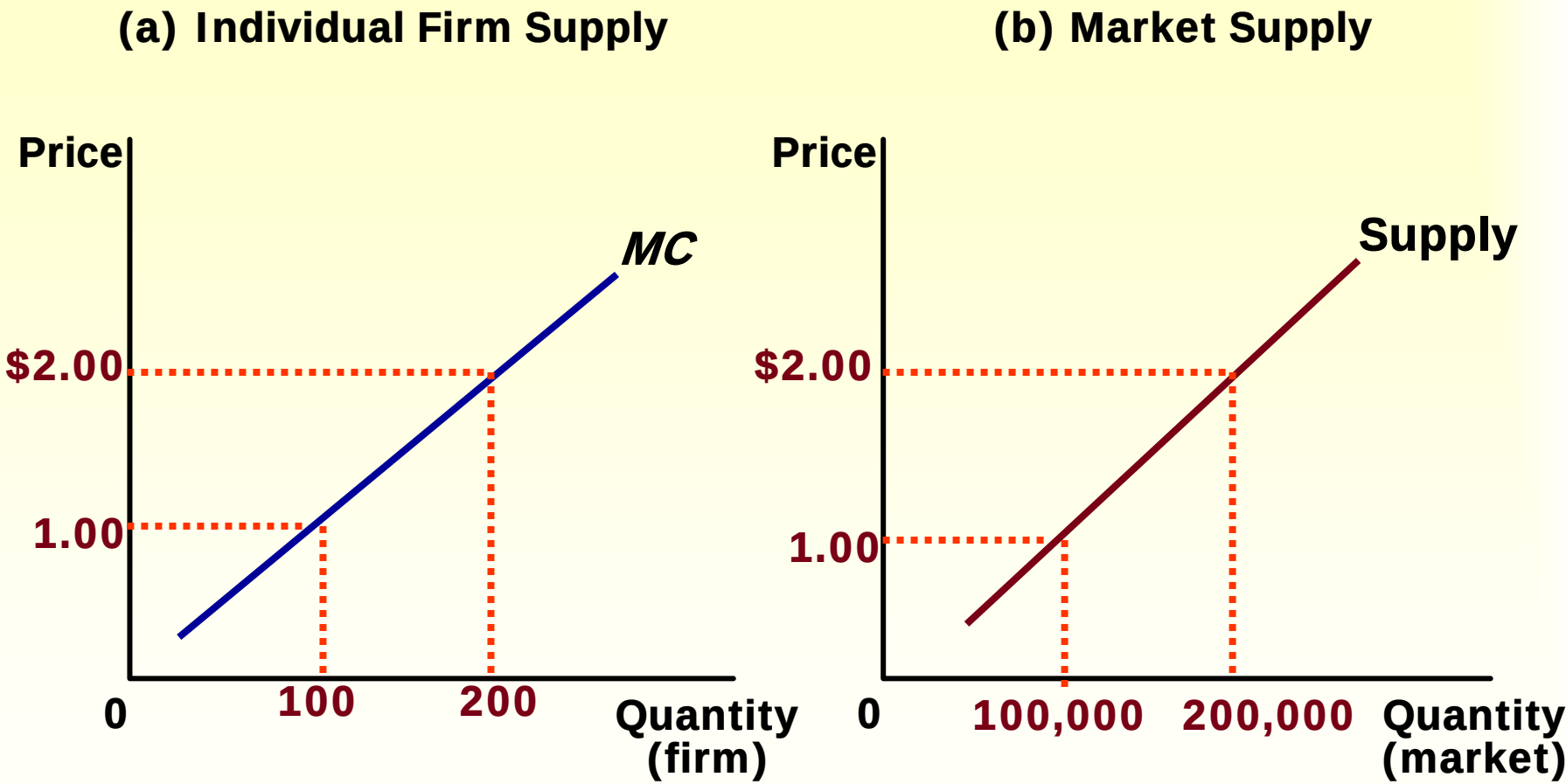
The Short Run: Market Supply with a Fixed Number of Firms...



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The Long Run: Market Supply with Entry and Exit

- Firms will enter or exit the market until profit is driven to zero.
- In the long run, price equals the minimum of average total cost.
- The long-run market supply curve is horizontal at this price.

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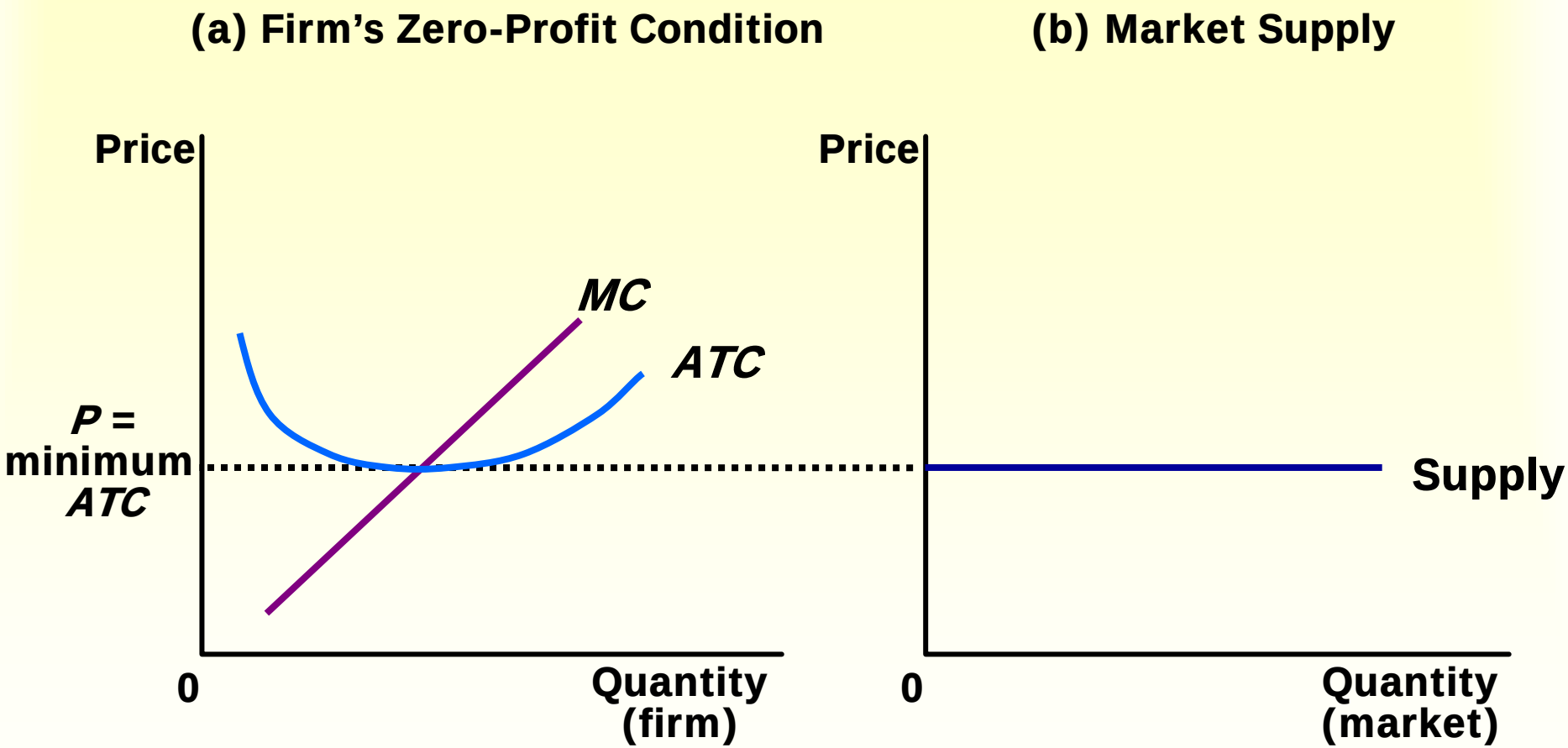
The Long Run: Market Supply with Entry and Exit...



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The Long Run: Market Supply with Entry and Exit

- At the end of the process of entry and exit, firms that remain must be making zero economic profit.
- The process of entry & exit ends only when price and average total cost are driven to equality.
- Long-run equilibrium must have firms operating at their efficient scale.

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Firms Stay in Business with Zero Profit

- Profit equals total revenue minus total cost.
- Total cost includes all the opportunity costs of the firm.
- In the zero-profit equilibrium, the firm's revenue compensates the owners for the time and money they expend to keep the business going.

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Increase in Demand in the Short Run

- An increase in demand raises price and quantity in the short run.
- Firms earn profits because price now exceeds average total cost.

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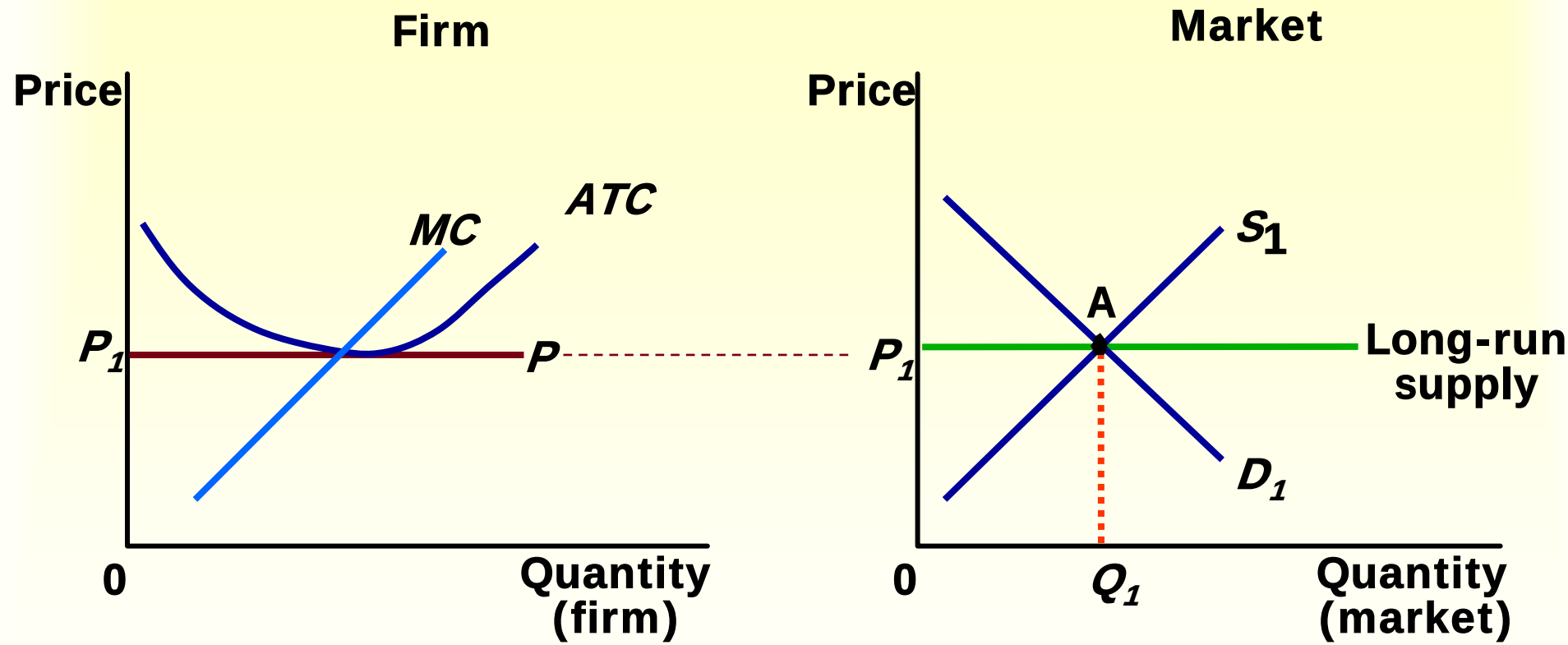
Increase in Demand in the Short Run...

(a) Initial Condition



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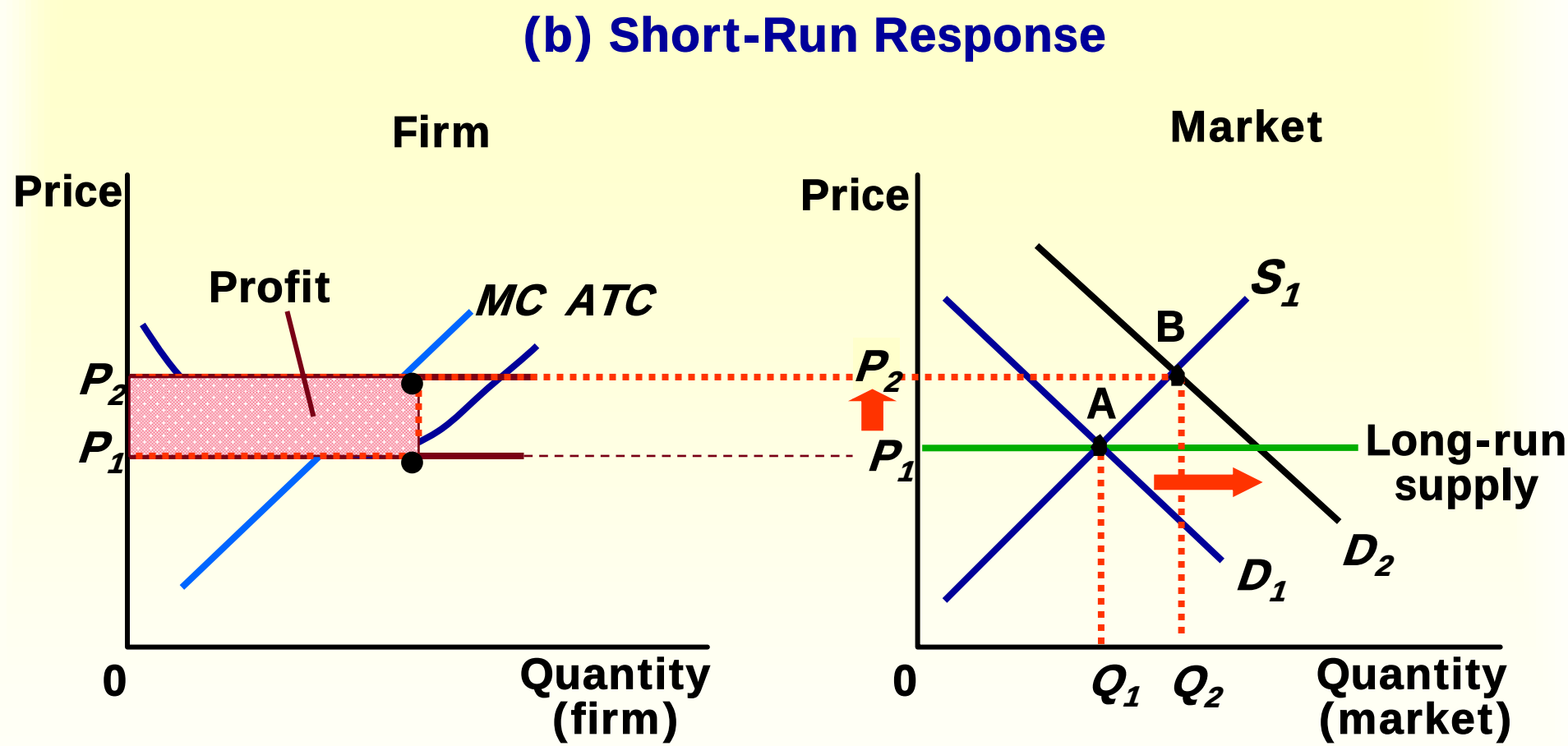
Increase in Demand in the Short Run...



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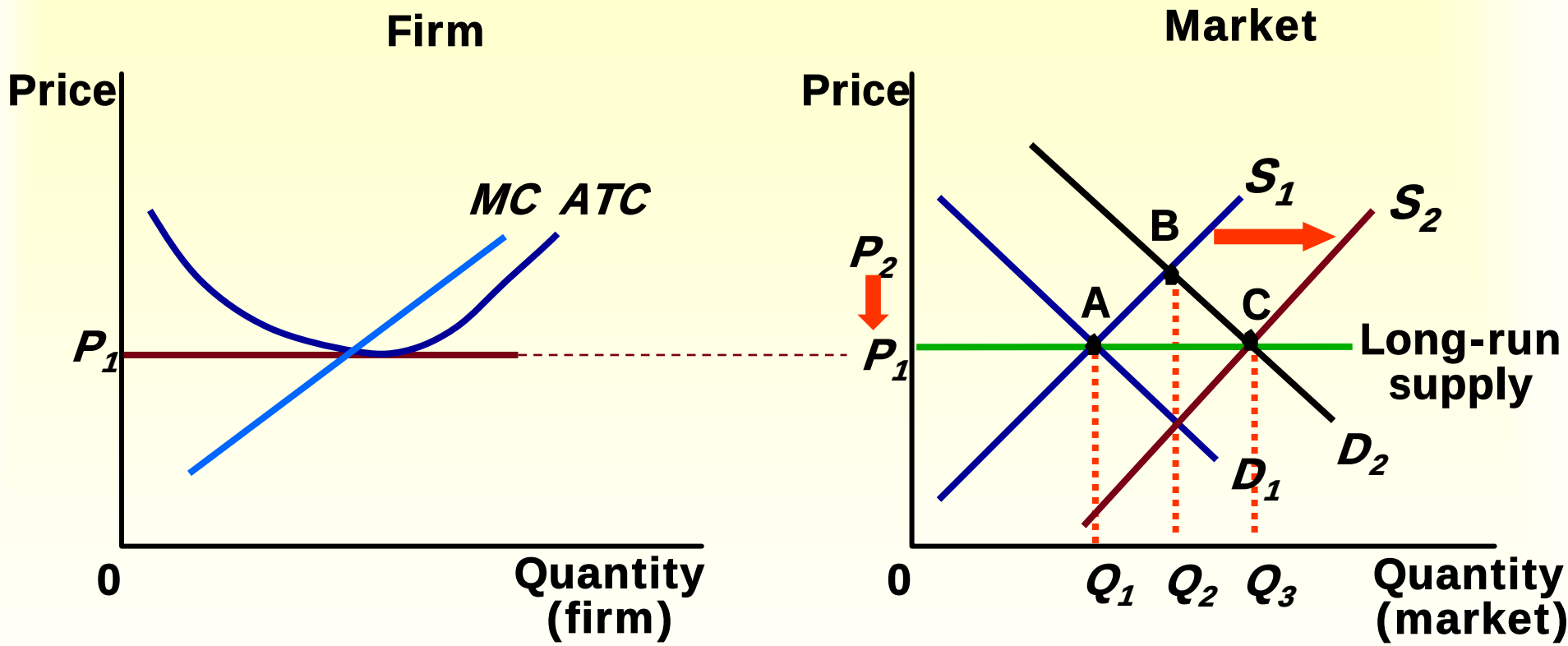
Increase in Demand in the Short Run...

(c) Long-Run Response



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Why the Long-Run Supply Curve Might Slope Upward

- Some resources used in production may be available only in limited quantities.
- Firms may have different costs.

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Marginal Firm

The marginal firm is the firm that would exit the market if the price were any lower.

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Summary

- Because a competitive firm is a price taker, its revenue is proportional to the amount of output it produces.
- The price of the good equals both the firm's average revenue and its marginal revenue.

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Summary

- To maximize profit a firm chooses the quantity of output such that marginal revenue equals marginal cost.
- This is also the quantity at which price equals marginal cost.
- Therefore, the firm's marginal cost curve is its supply curve.

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Summary

- In the short run when a firm cannot recover its fixed costs, the firm will choose to shut down temporarily if the price of the good is less than average variable cost.
- In the long run when the firm can recover both fixed and variable costs, it will choose to exit if the price is less than average total cost.

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Summary

- In a market with free entry and exit, profits are driven to zero in the long run and all firms produce at the efficient scale.
- Changes in demand have different effects over different time horizons.

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Graphical Review

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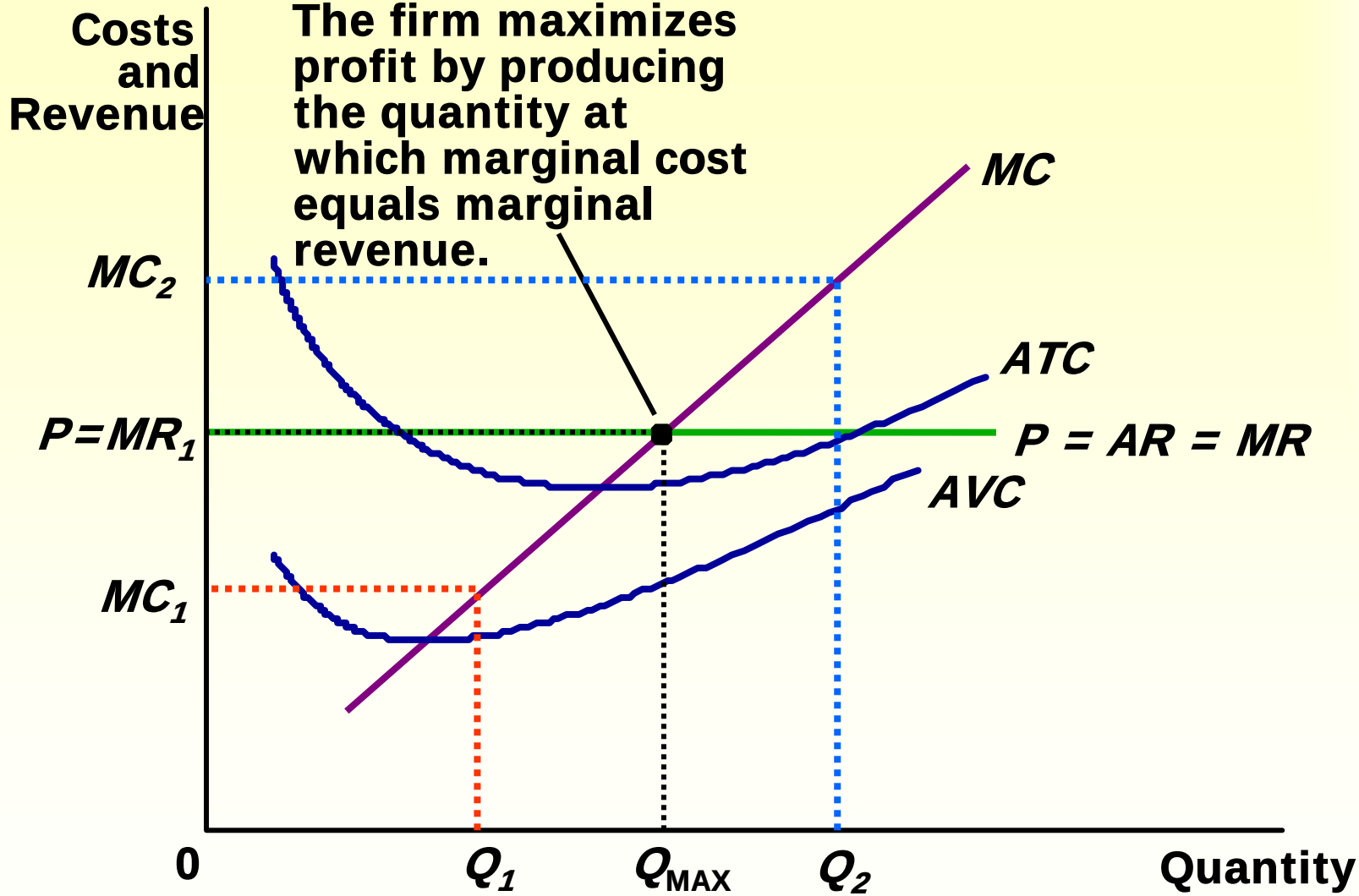
Profit Maximization for the Competitive Firm...



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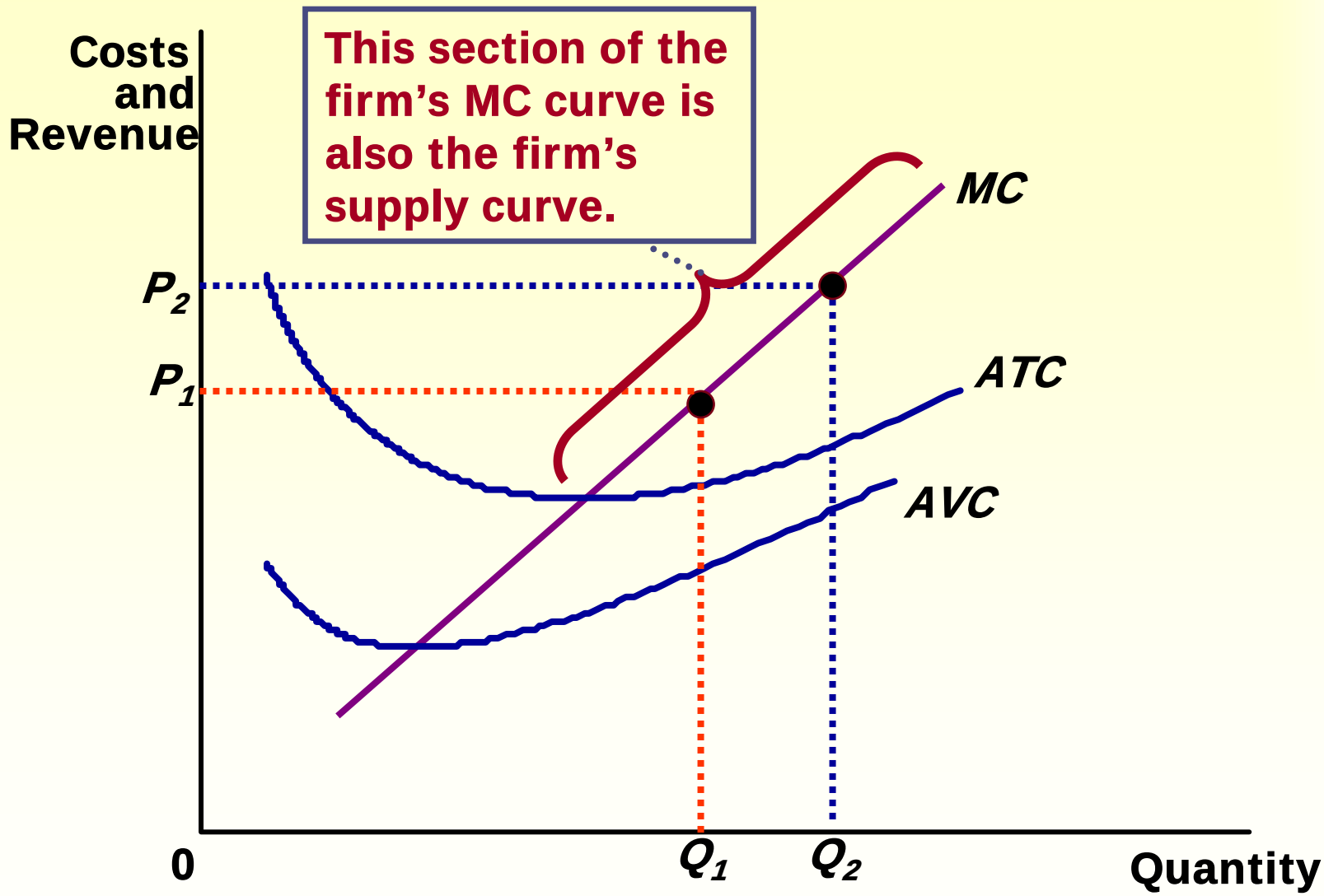
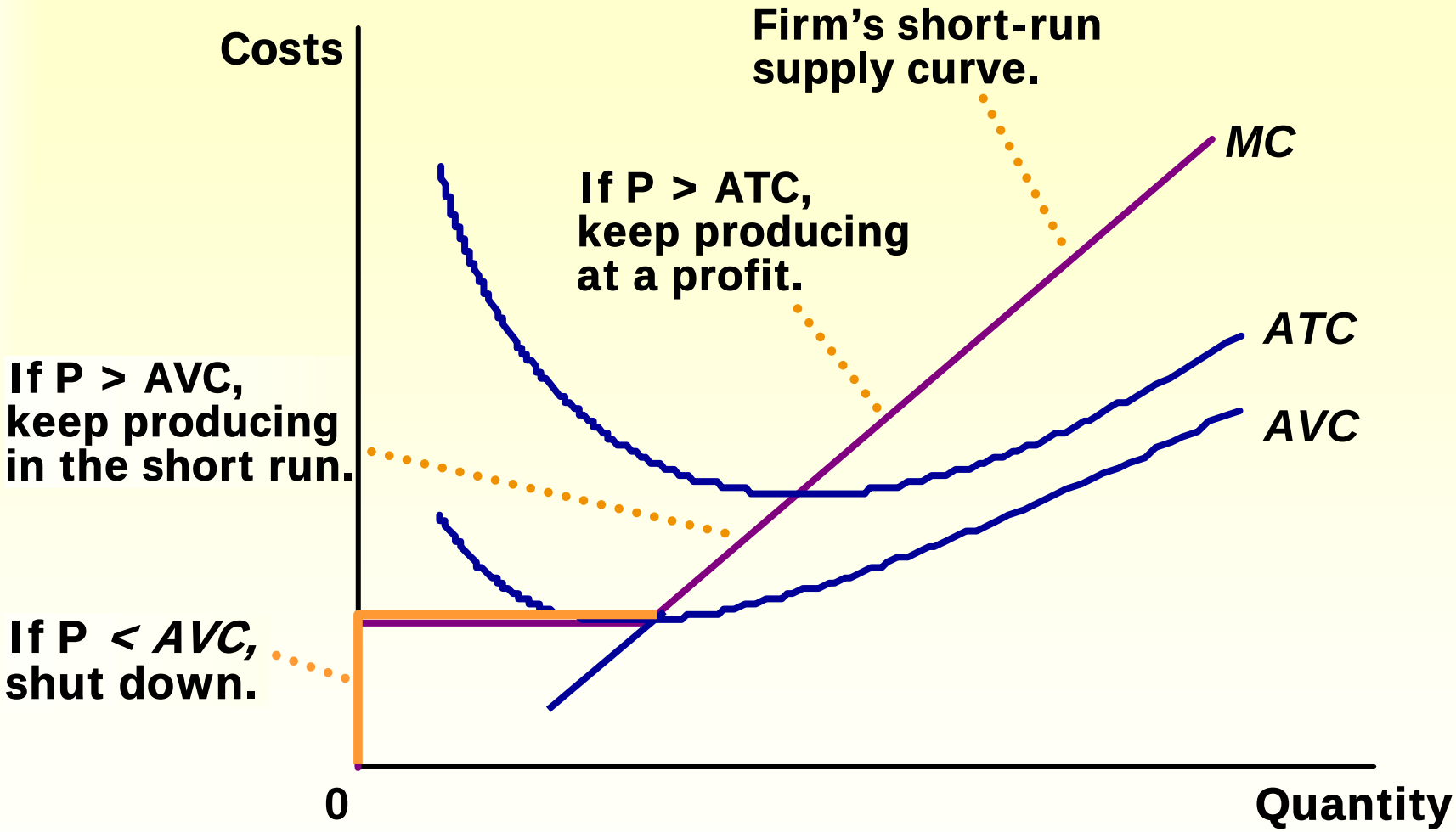
The Marginal-Cost Curve and the Firm's Supply Decision...



The Firm's Short-Run Decision to Shut Down...



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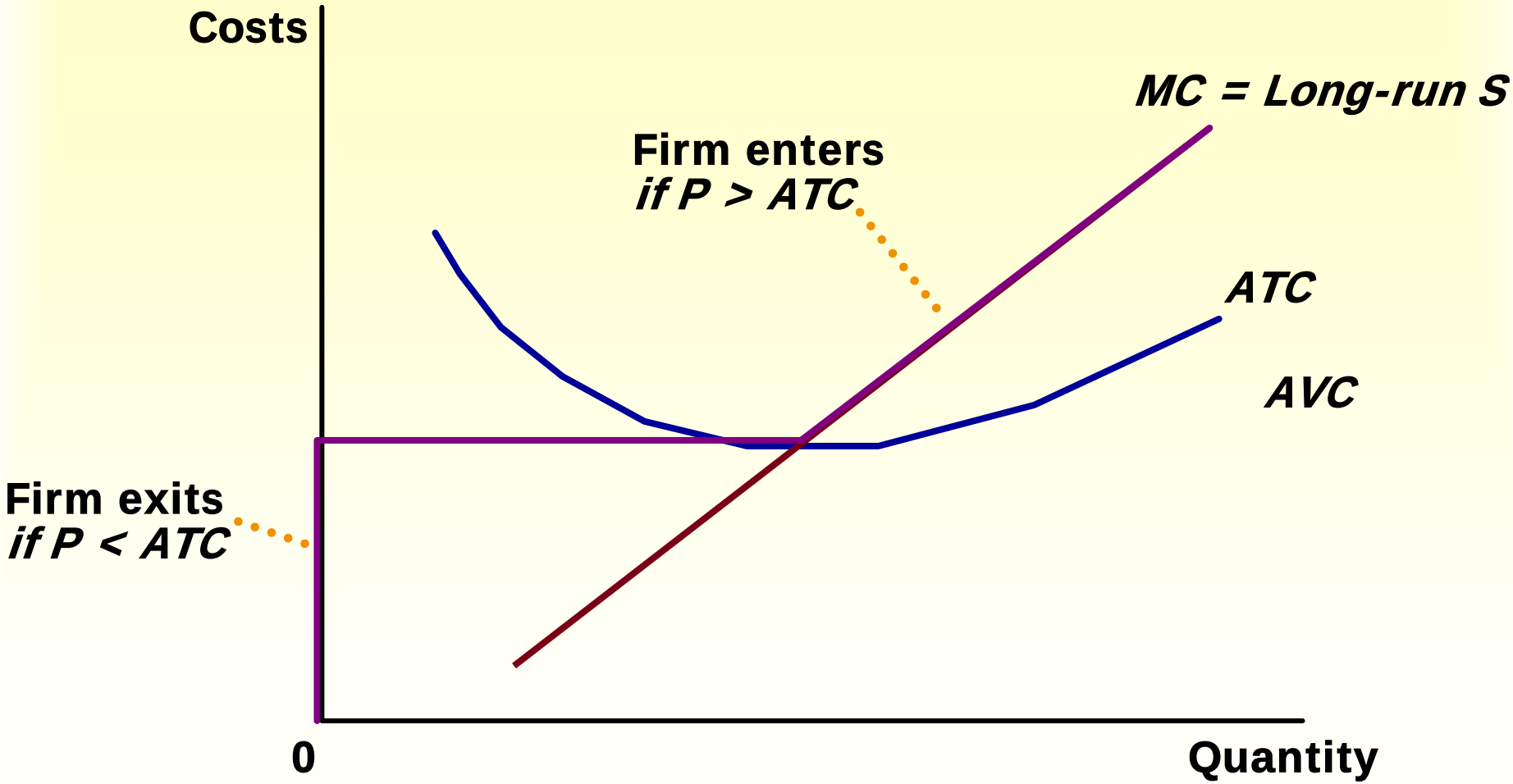
The Competitive Firm's Long-Run Supply Curve...



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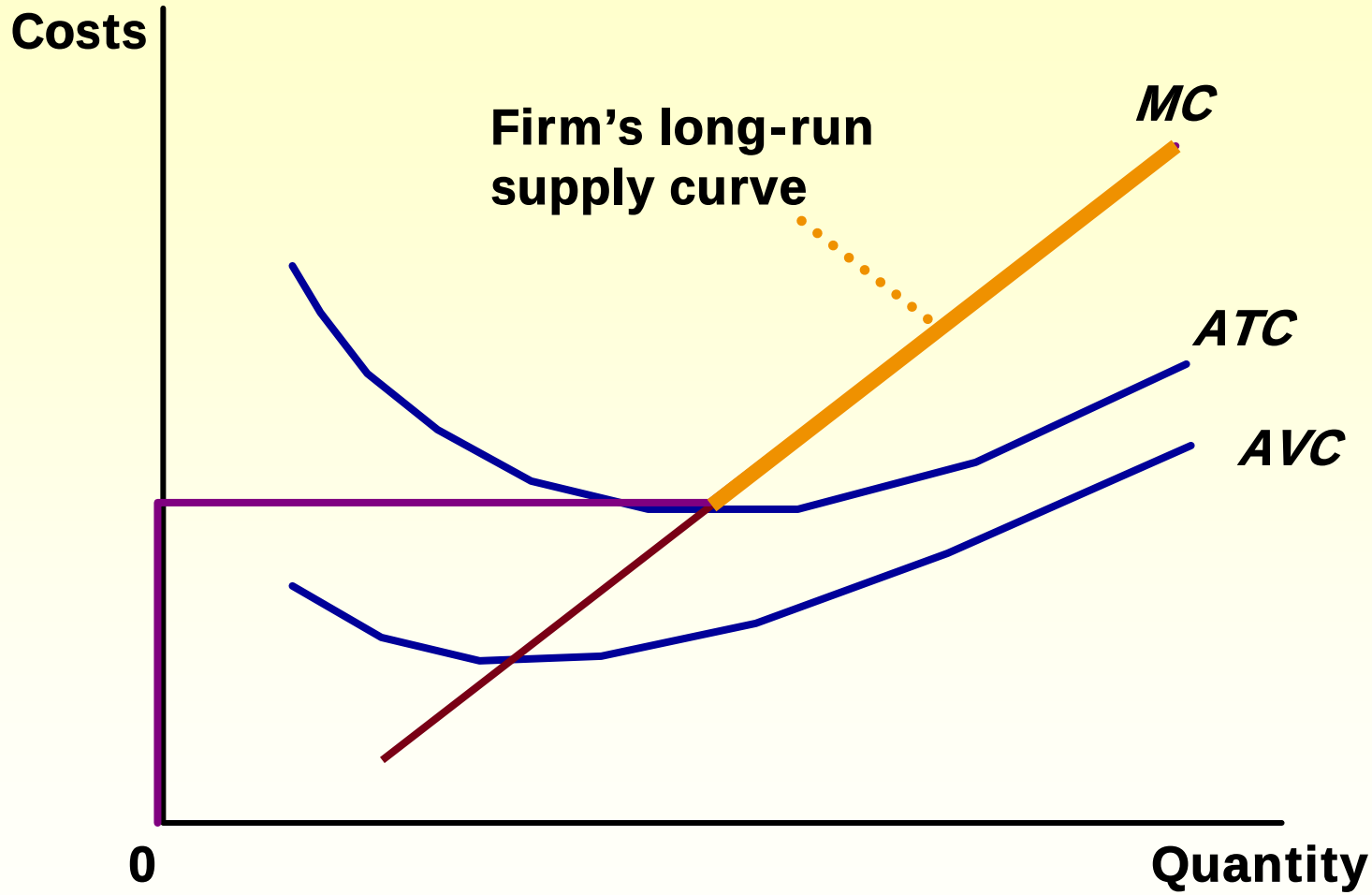
The Competitive Firm's Long-Run Supply Curve...



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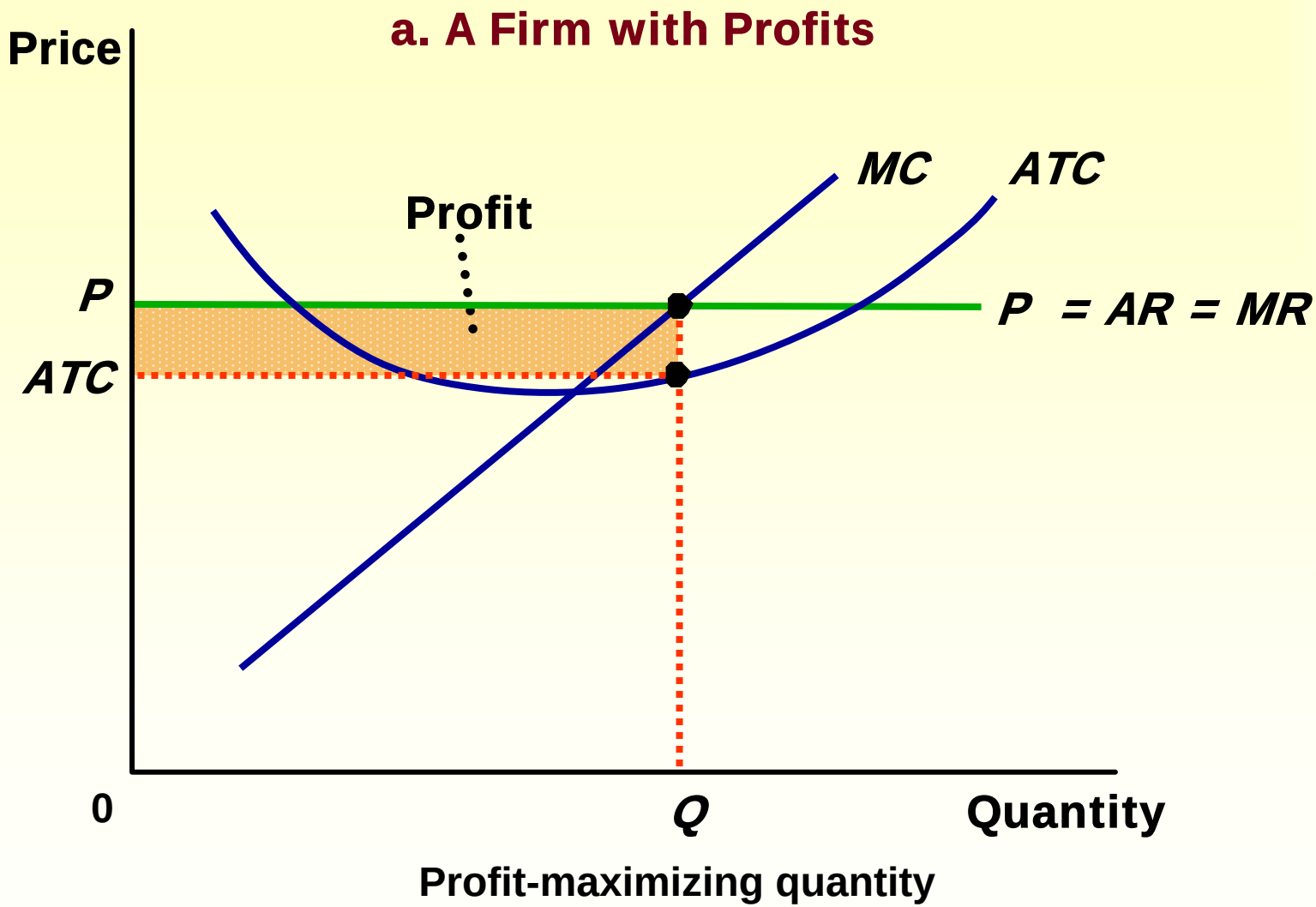
Measuring Profit in the Graph for the Competitive Firm...



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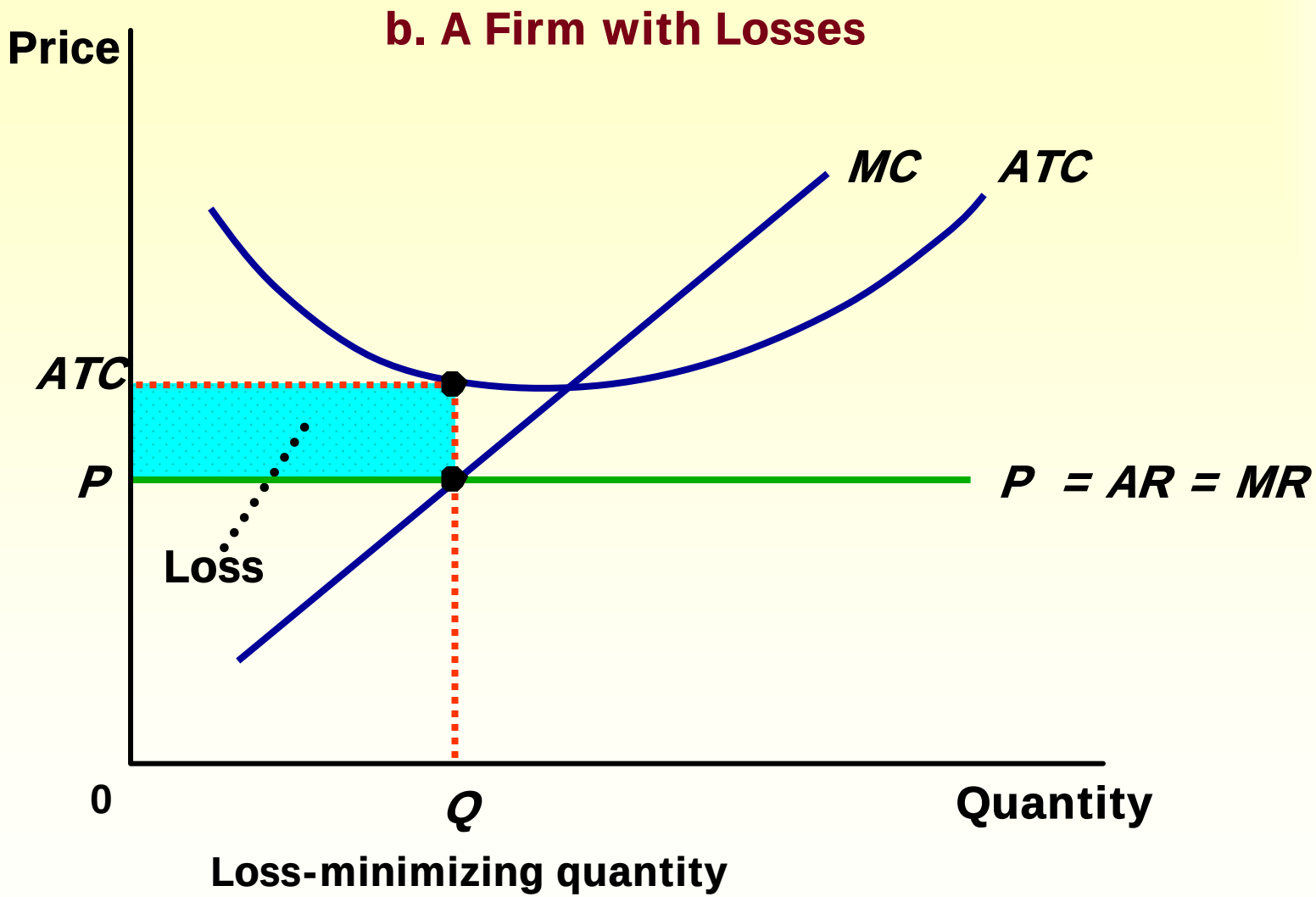
Measuring Profit in the Graph for the Competitive Firm...



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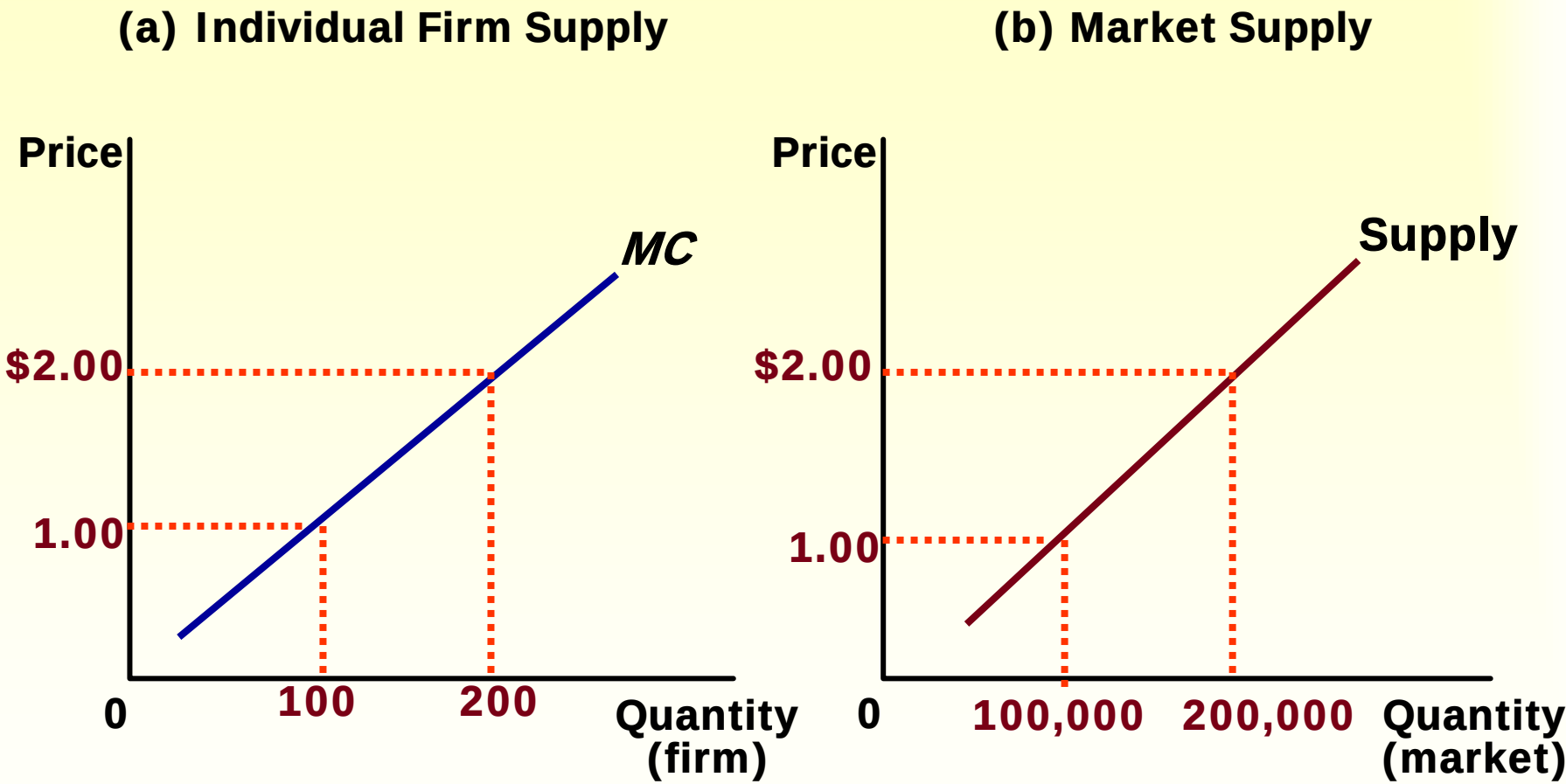
The Short Run: Market Supply with a Fixed Number of Firms...



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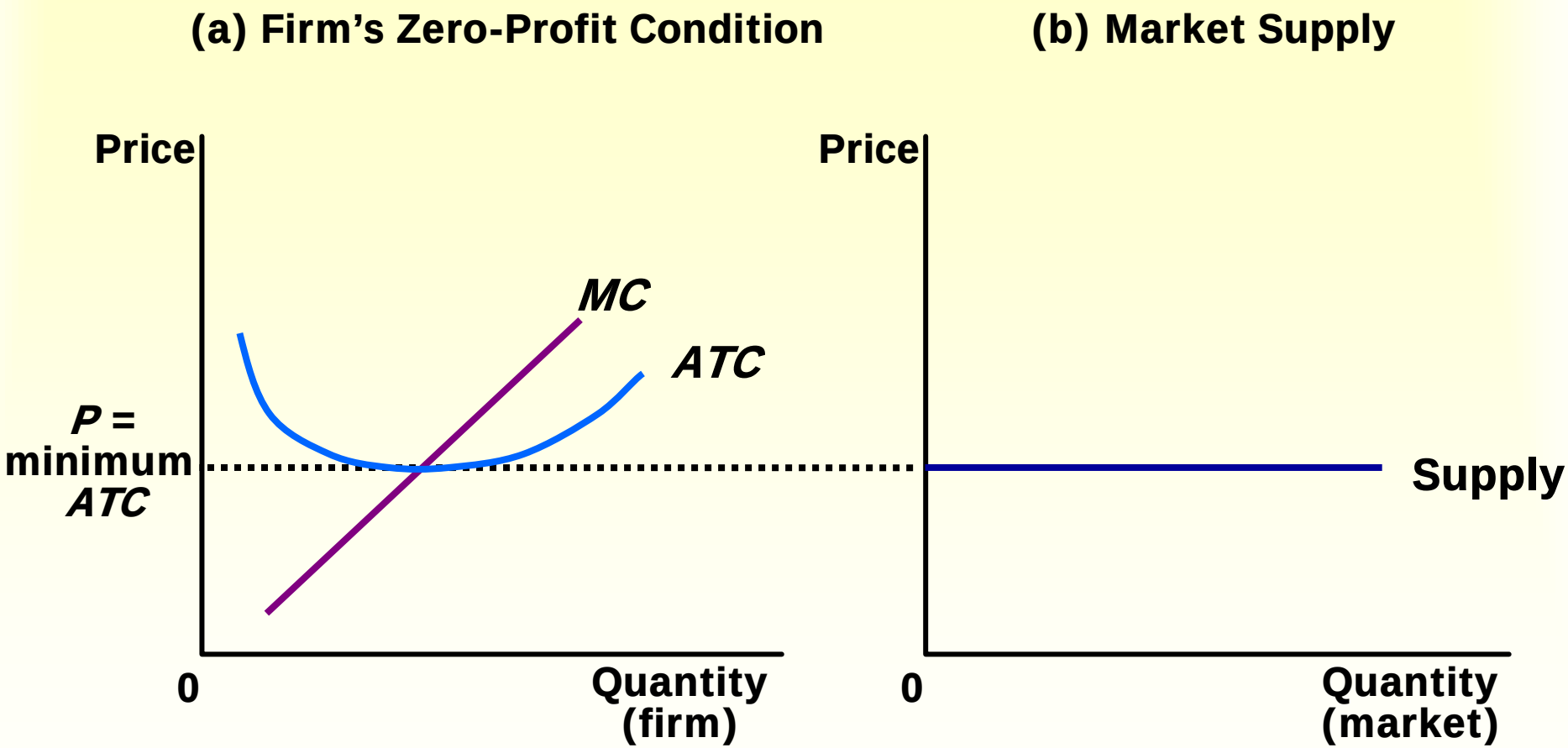
The Long Run: Market Supply with Entry and Exit...



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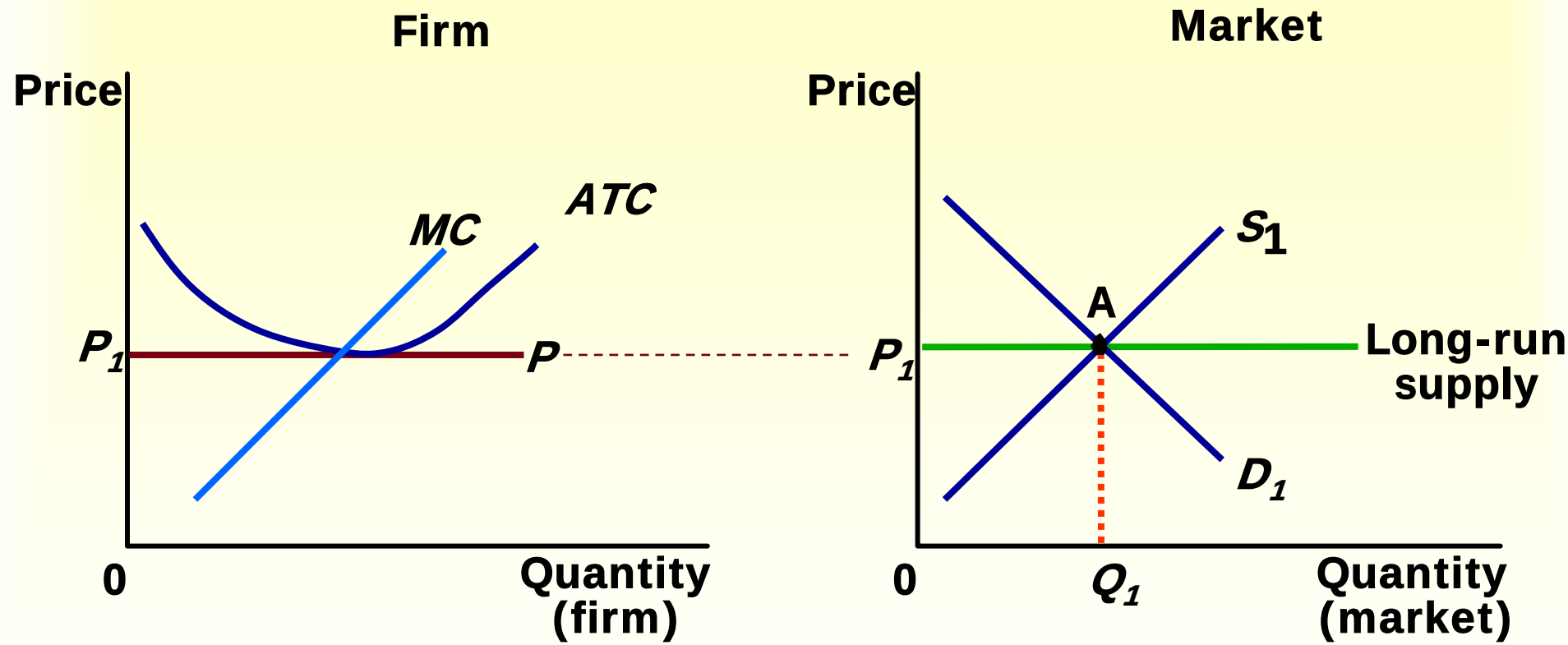
Increase in Demand in the Short Run...

(a) Initial Condition



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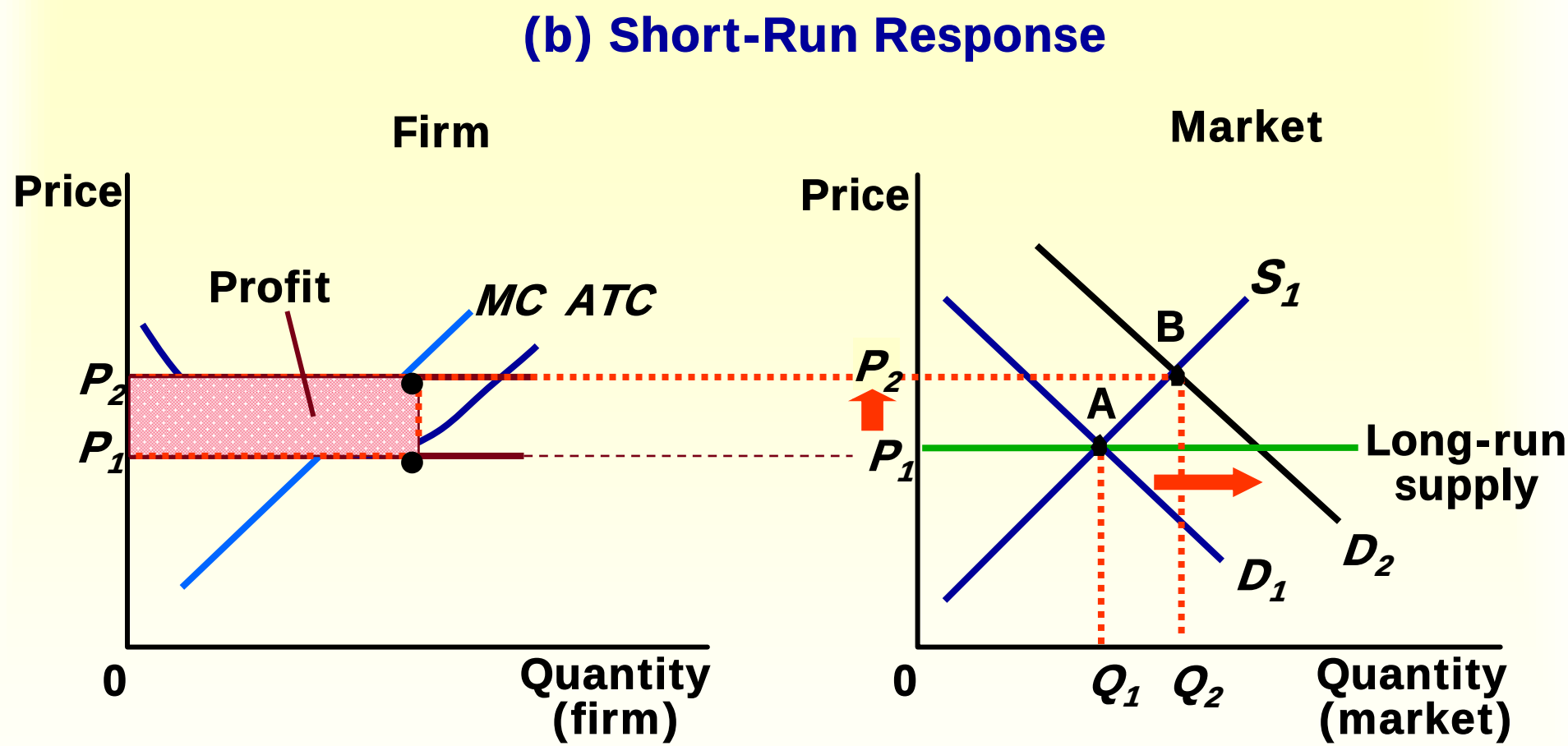
Increase in Demand in the Short Run...



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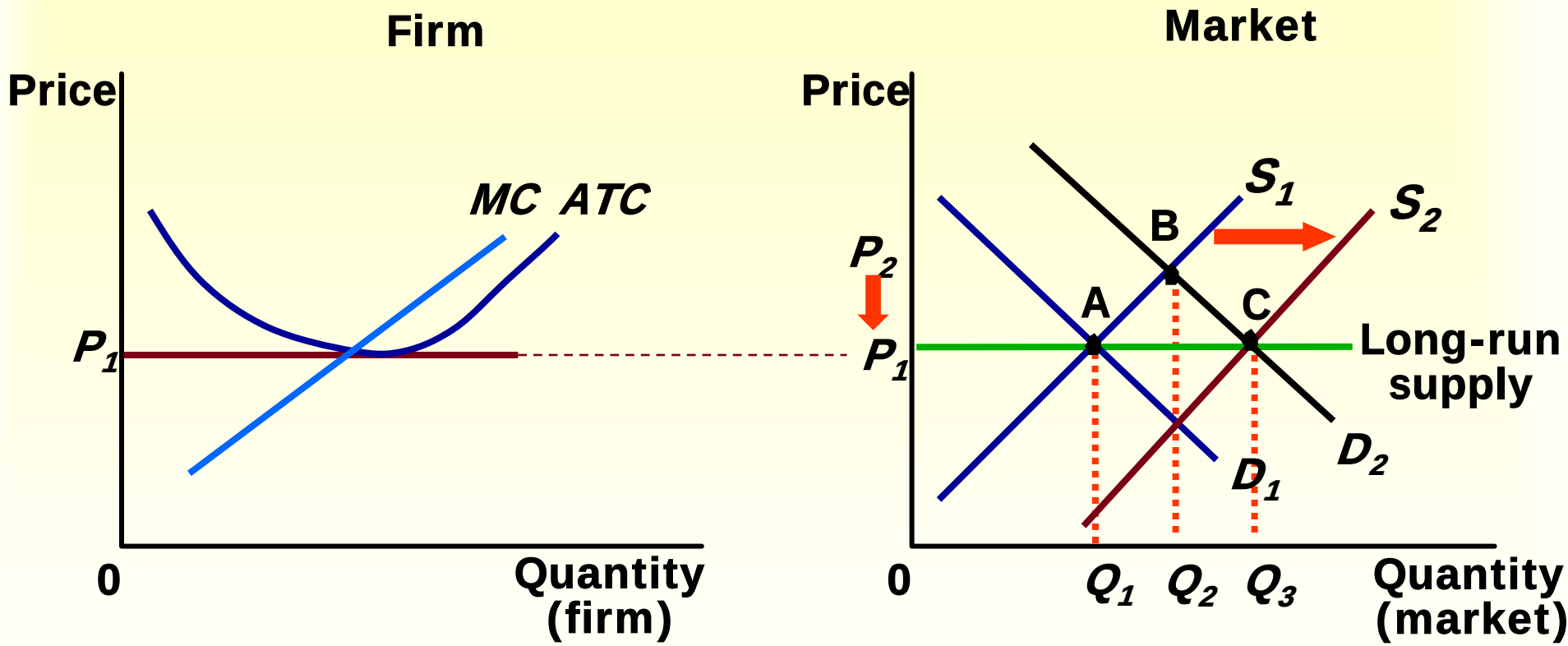
Increase in Demand in the Short Run...

(c) Long-Run Response



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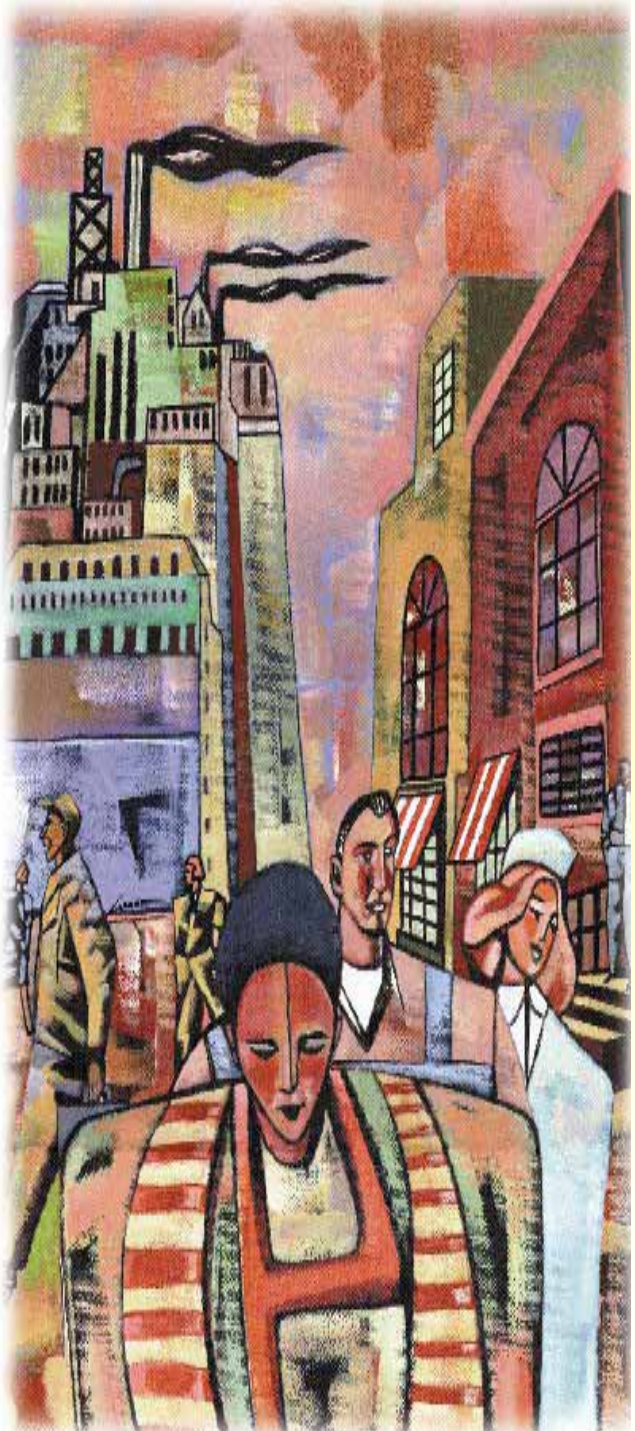

Monopoly

Chapter 15

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Monopoly

While a competitive firm is a price taker, a monopoly firm is a price maker.

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Monopoly

- **A firm is considered a monopoly if . . .**
  - **. . .it is the sole seller of its product.**
  - **. . .its product does not have close substitutes.**

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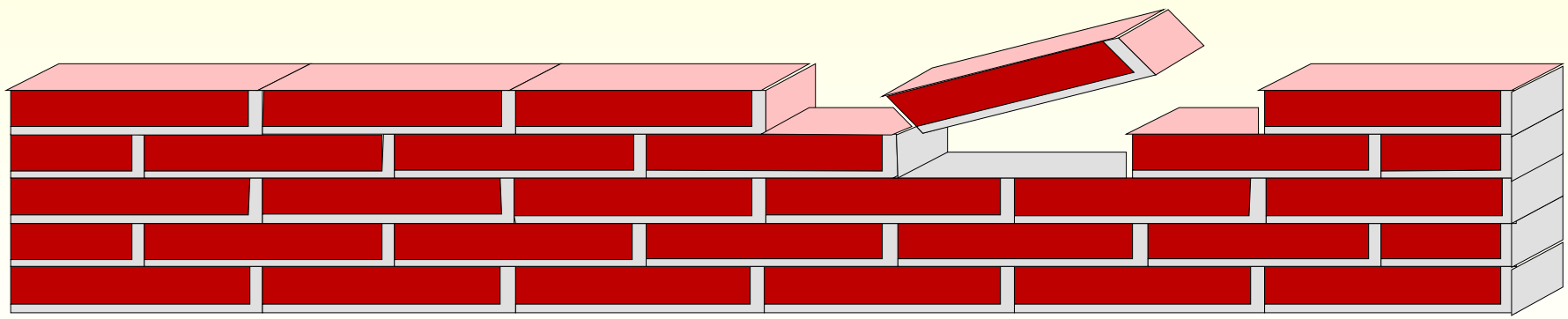
Why Monopolies Arise

The fundamental cause of monopoly is barriers to entry.



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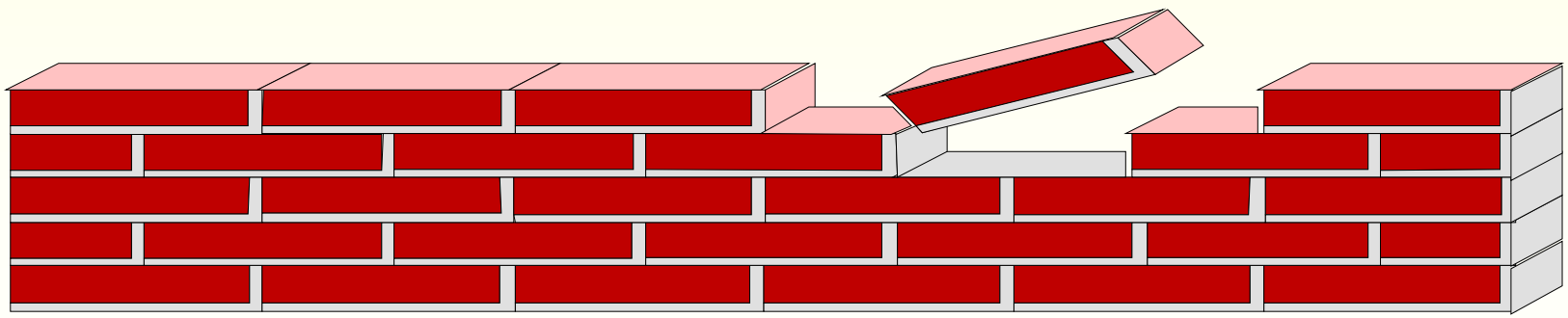
Why Monopolies Arise

Barriers to entry have three sources:

- Ownership of a key resource.
- The government gives a single firm the exclusive right to produce some good.
- Costs of production make a single producer more efficient than a large number of producers.



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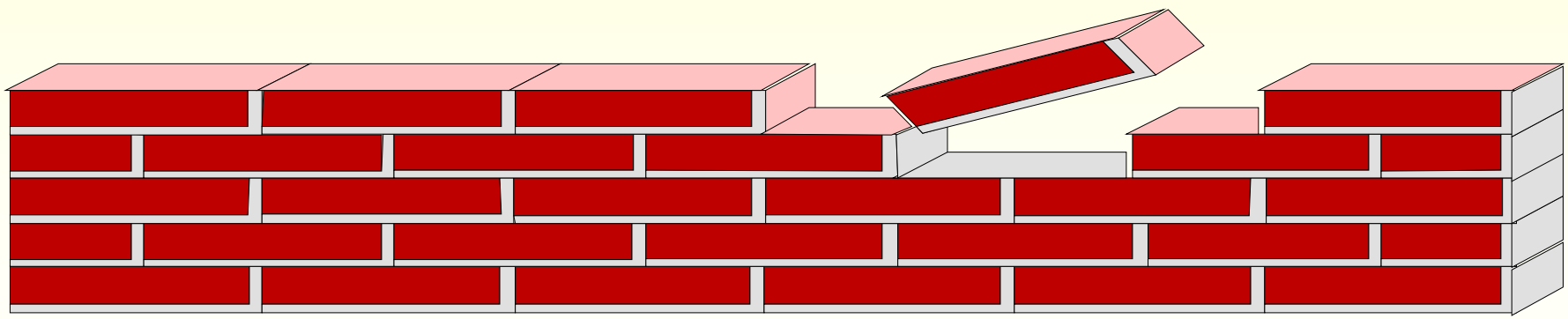
Monopoly Resources

Although exclusive ownership of a key resource is a potential source of monopoly, in practice monopolies rarely arise for this reason.



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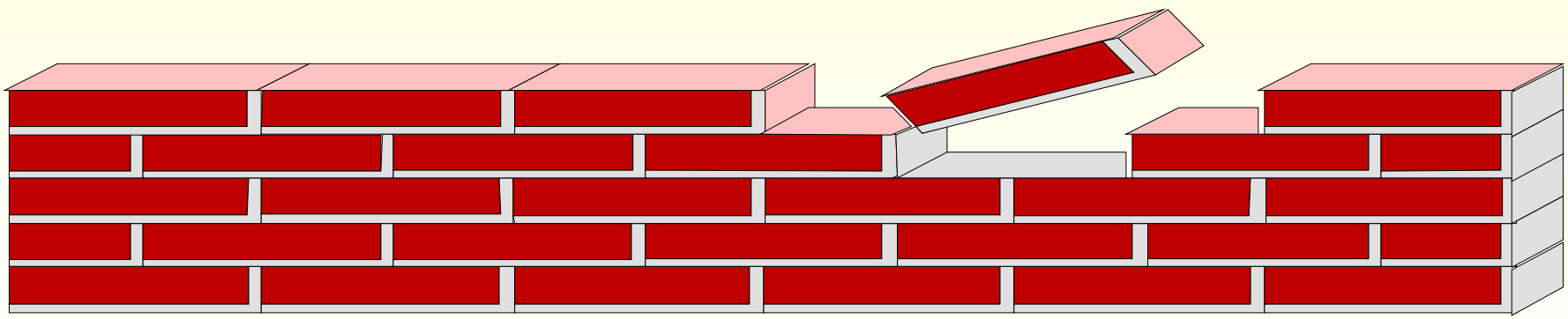
Government-Created Monopolies

Governments may restrict entry by giving a single firm the exclusive right to sell a particular good in certain markets.



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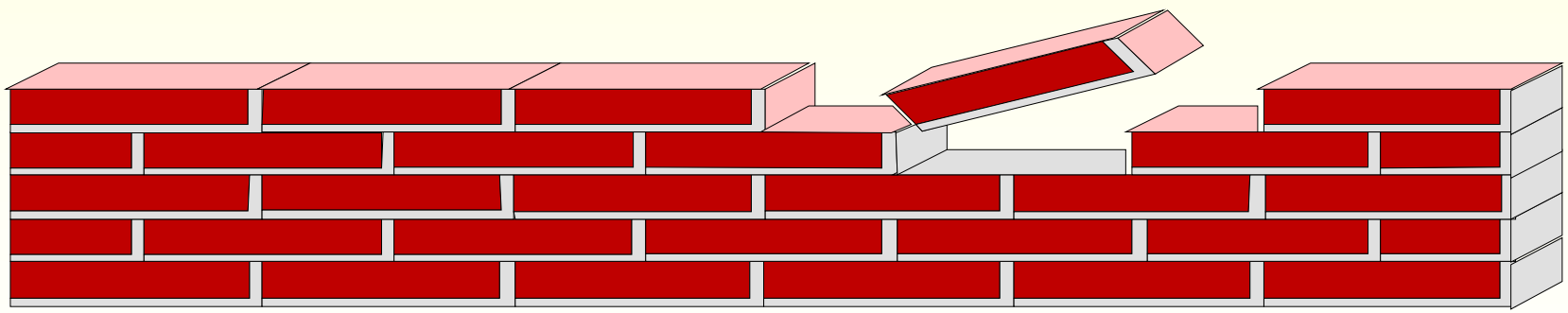
Government-Created Monopolies

Patent and copyright laws are two important examples of how government creates a monopoly to serve the public interest.



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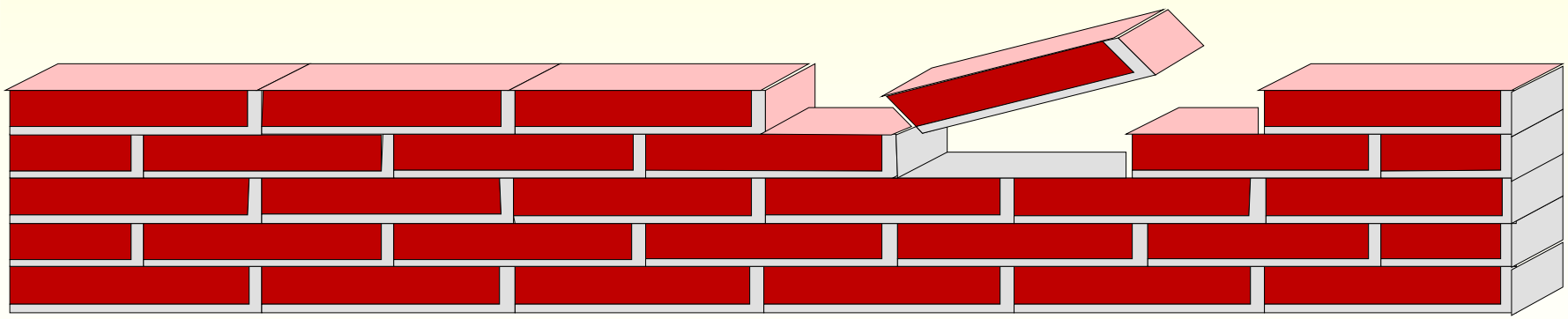
Natural Monopolies

An industry is a natural monopoly when a single firm can supply a good or service to an entire market at a smaller cost than could two or more firms.



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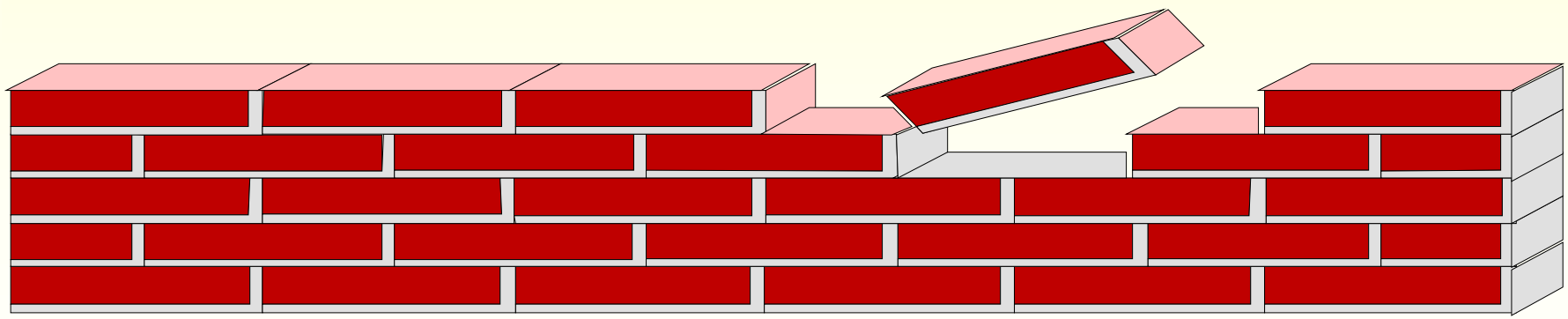
Natural Monopolies

A natural monopoly arises when there are economies of scale over the relevant range of output.



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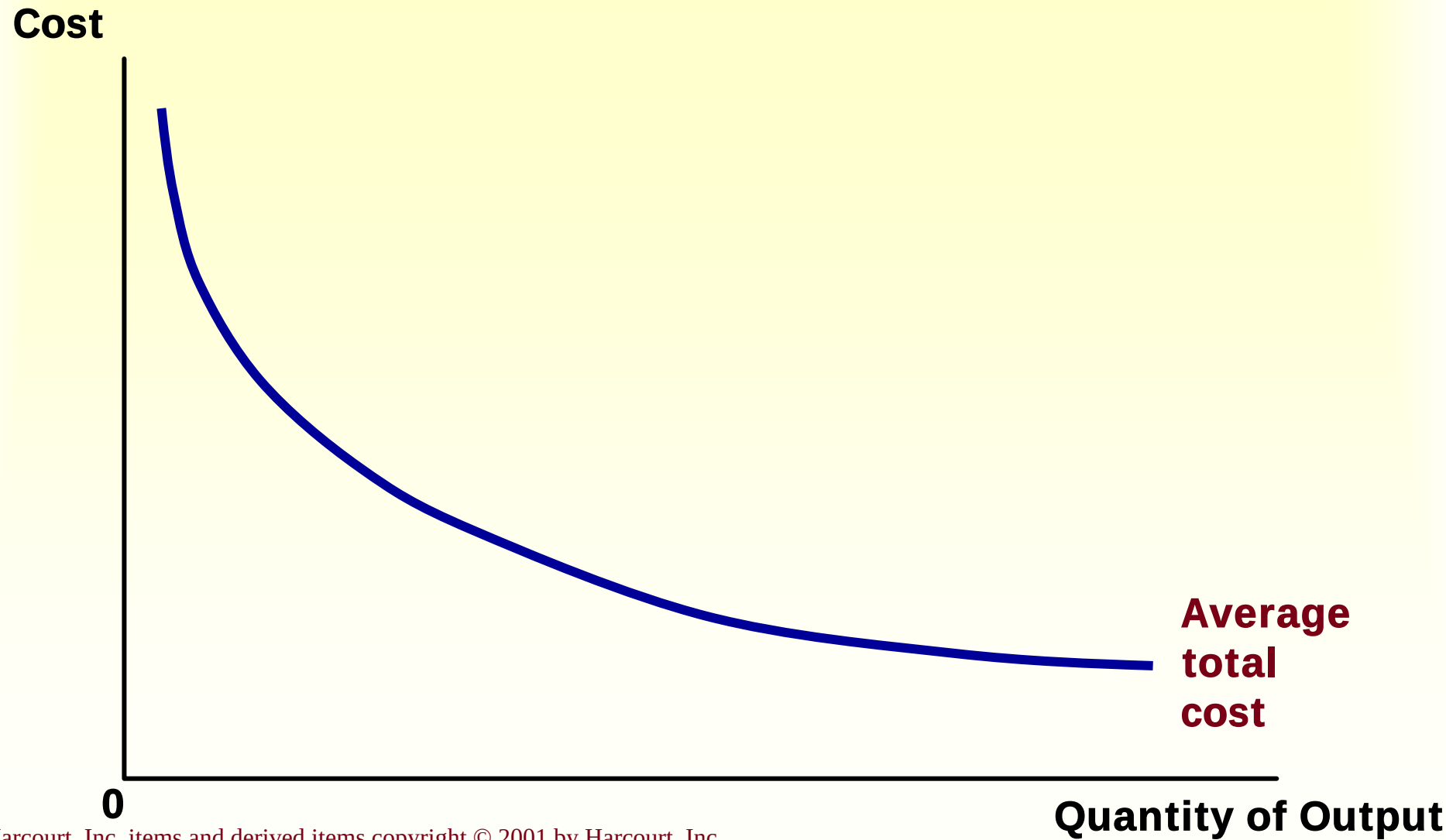
Economies of Scale as a Cause of Monopoly...



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Monopoly versus Competition

Monopoly

- Is the sole producer
- Has a downward-sloping demand curve
- Is a price maker
- Reduces price to increase sales

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Competition versus Monopoly

Competitive Firm

- Is one of many producers
- Has a horizontal demand curve
- Is a price taker
- Sells as much or as little at same price

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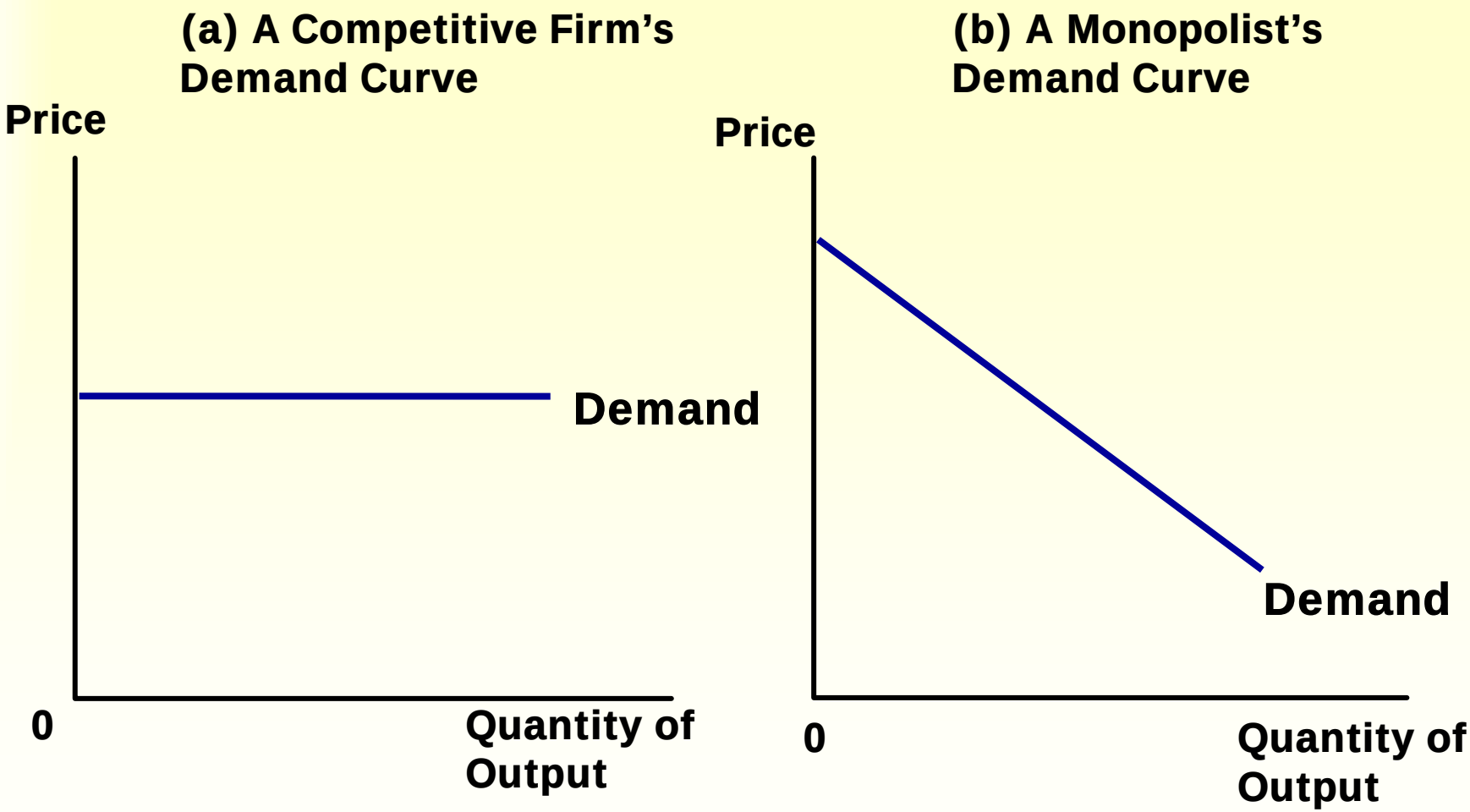
Demand Curves for Competitive and Monopoly Firms...



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A Monopoly's Revenue

- **Total Revenue**

$$P \times Q = TR$$

- **Average Revenue**

$$TR/Q = AR = P$$

- **Marginal Revenue**

$$\Delta TR/\Delta Q = MR$$

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A Monopoly's Total, Average, and Marginal Revenue

Quantity (Q)	Price (P)	Total Revenue (TR=PxQ)	Average Revenue (AR=TR/Q)	Marginal Revenue (MR= $\Delta TR / \Delta Q$)
0	$11.00	$0.00		
1	$10.00	$10.00	$10.00	$10.00
2	$9.00	$18.00	$9.00	$8.00
3	$8.00	$24.00	$8.00	$6.00
4	$7.00	$28.00	$7.00	$4.00
5	$6.00	$30.00	$6.00	$2.00
6	$5.00	$30.00	$5.00	$0.00
7	$4.00	$28.00	$4.00	-$2.00
8	$3.00	$24.00	$3.00	-$4.00

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A Monopoly's Marginal Revenue

A monopolist's marginal revenue is always less than the price of its good.

- **The demand curve is downward sloping.**
- **When a monopoly drops the price to sell one more unit, the revenue received from previously sold units also decreases.**

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A Monopoly's Marginal Revenue

When a monopoly increases the amount it sells, it has two effects on total revenue (P x Q).

- **The output effect—more output is sold, so Q is higher.**
- **The price effect—price falls, so P is lower.**

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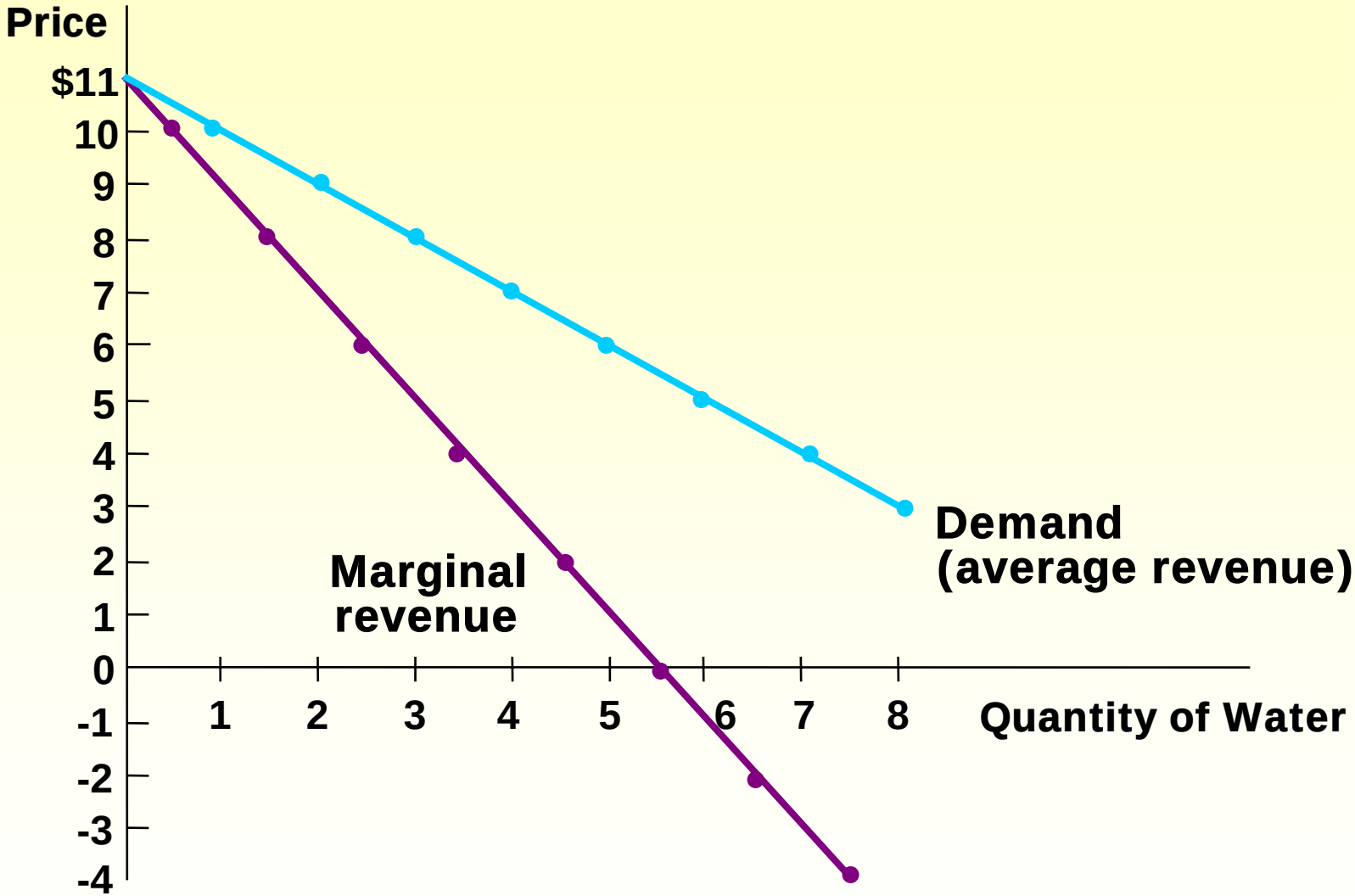
Demand and Marginal Revenue Curves for a Monopoly...



Profit Maximization of a Monopoly

- A monopoly maximizes profit by producing the quantity at which marginal revenue equals marginal cost.
- It then uses the demand curve to find the price that will induce consumers to buy that quantity.

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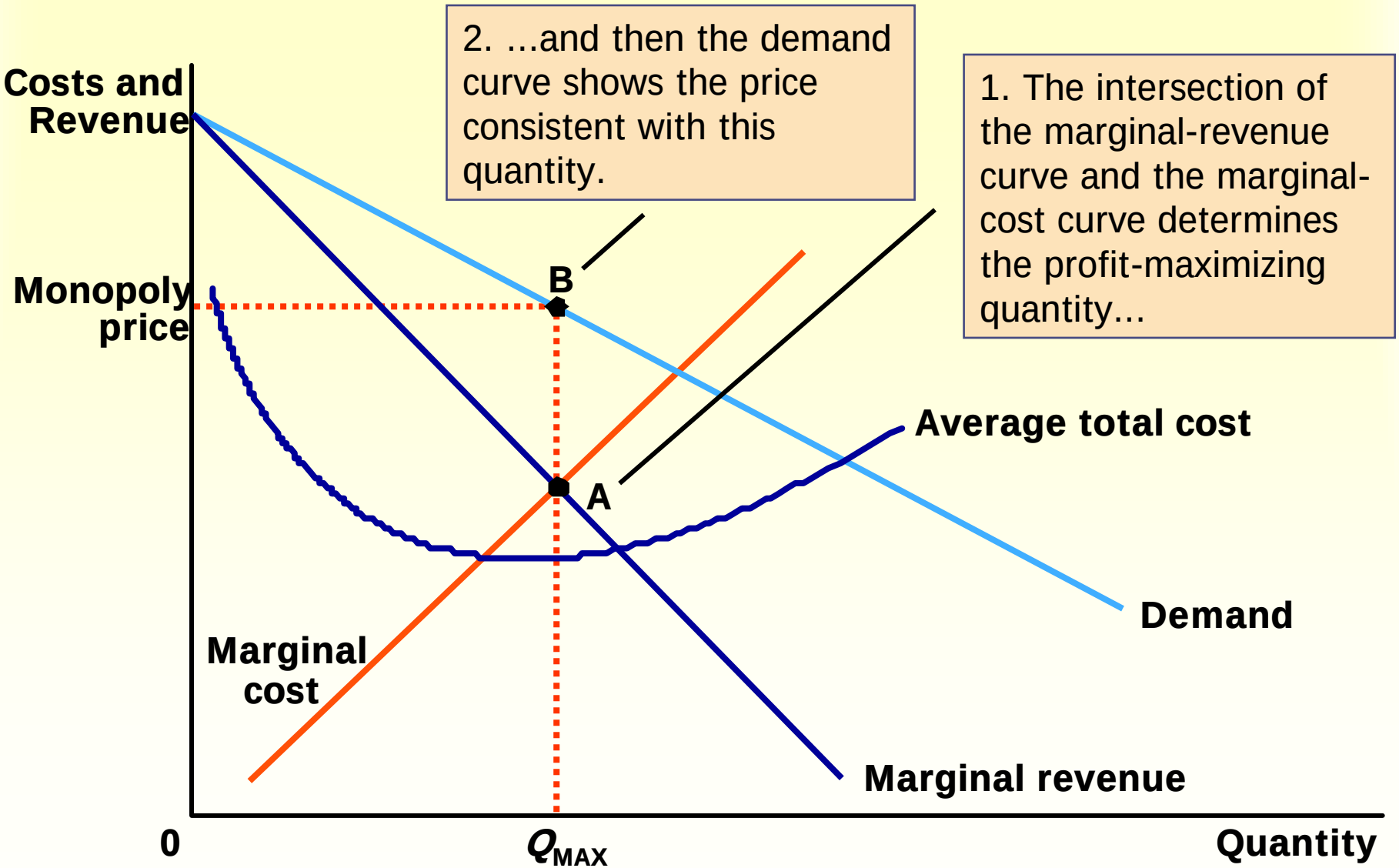
Profit-Maximization for a Monopoly...



Comparing Monopoly and Competition

- For a **competitive** firm, price equals marginal cost.

$$P = MR = MC$$

- For a **monopoly** firm, price exceeds marginal cost.

$$P > MR = MC$$

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A Monopoly's Profit

Profit equals total revenue minus total costs.

$$\text{Profit} = TR - TC$$

$$\text{Profit} = (TR/Q - TC/Q) \times Q$$

$$\text{Profit} = (P - ATC) \times Q$$

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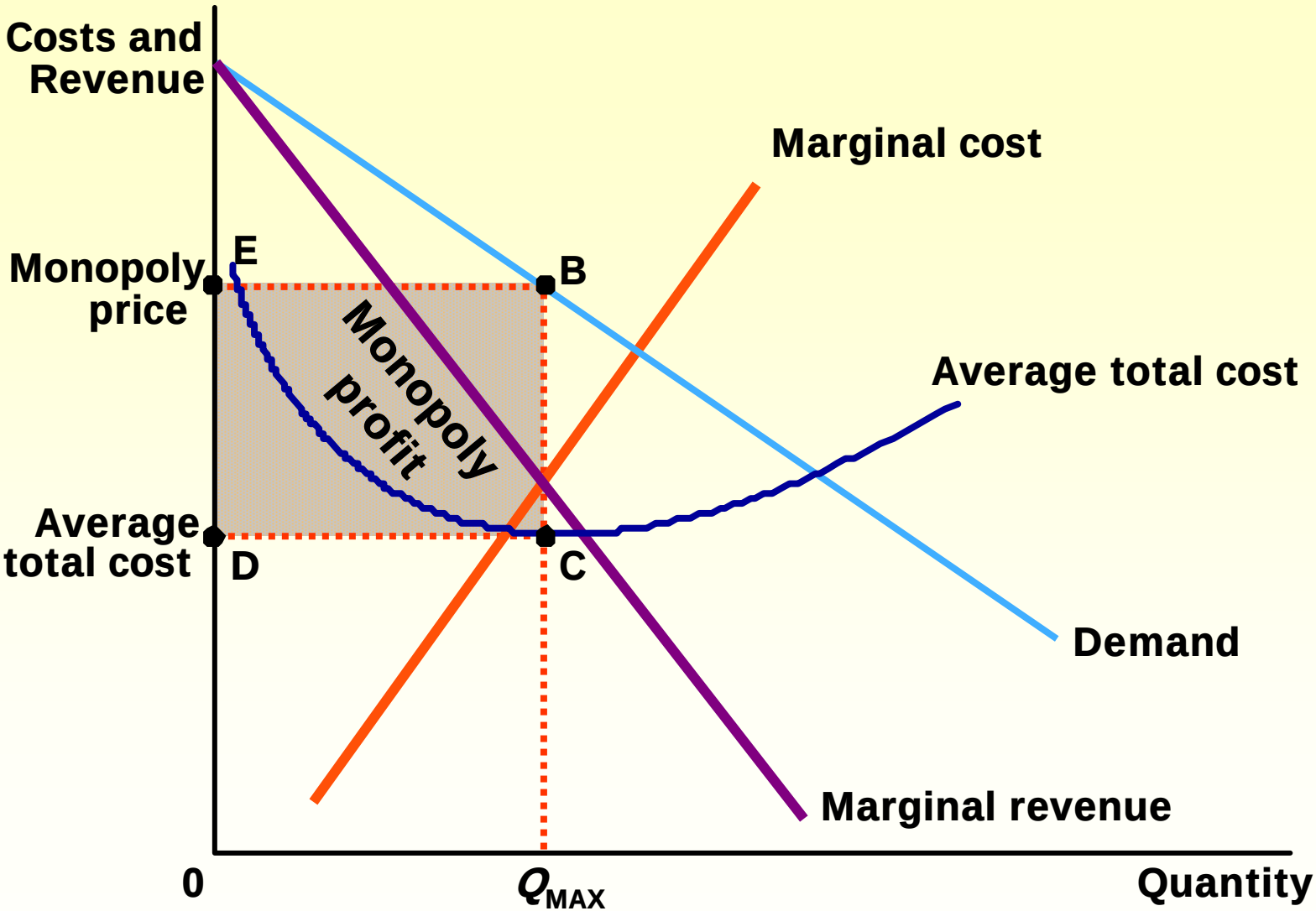
The Monopolist's Profit...



The Monopolist's Profit

The monopolist will receive economic profits as long as price is greater than average total cost.

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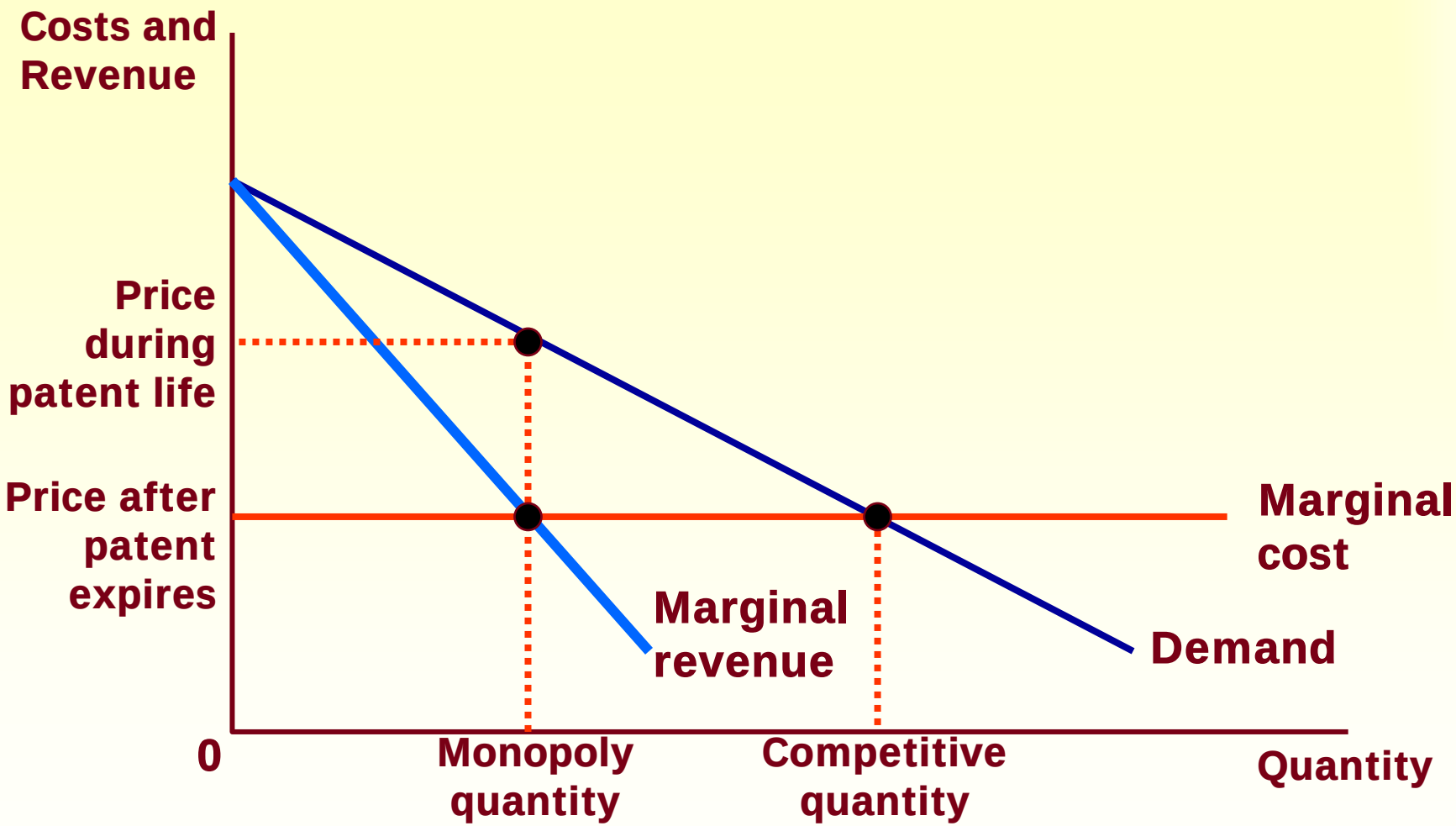
The Market for Drugs...



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The Welfare Cost of Monopoly

- In contrast to a competitive firm, the monopoly charges a price above the marginal cost.
- From the standpoint of consumers, this high price makes monopoly undesirable.
- However, from the standpoint of the owners of the firm, the high price makes monopoly very desirable.

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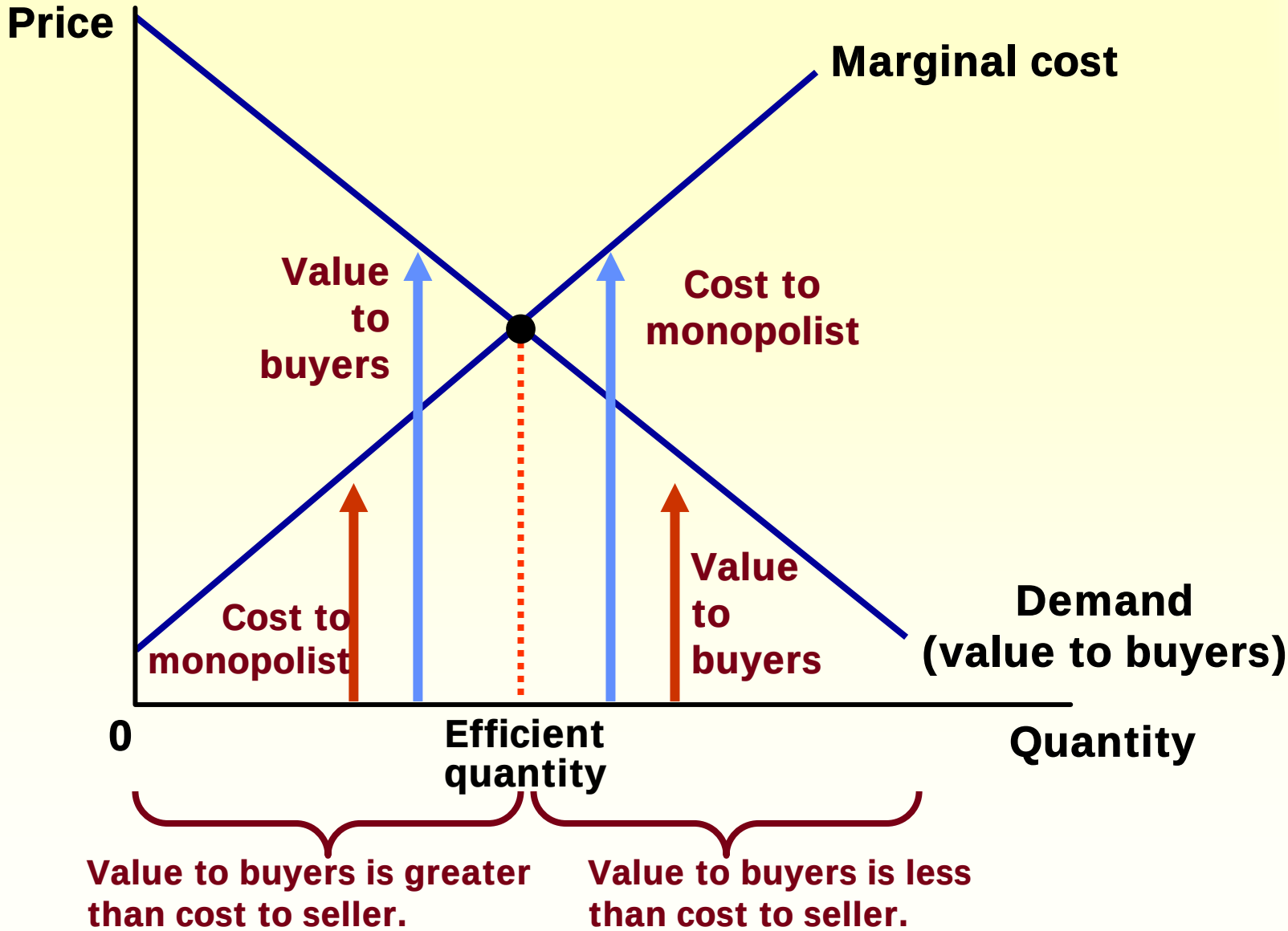
The Efficient Level of Output...



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The Deadweight Loss

Because a monopoly sets its price above marginal cost, it places a wedge between the consumer's willingness to pay and the producer's cost.

- **This wedge causes the quantity sold to fall short of the social optimum.**

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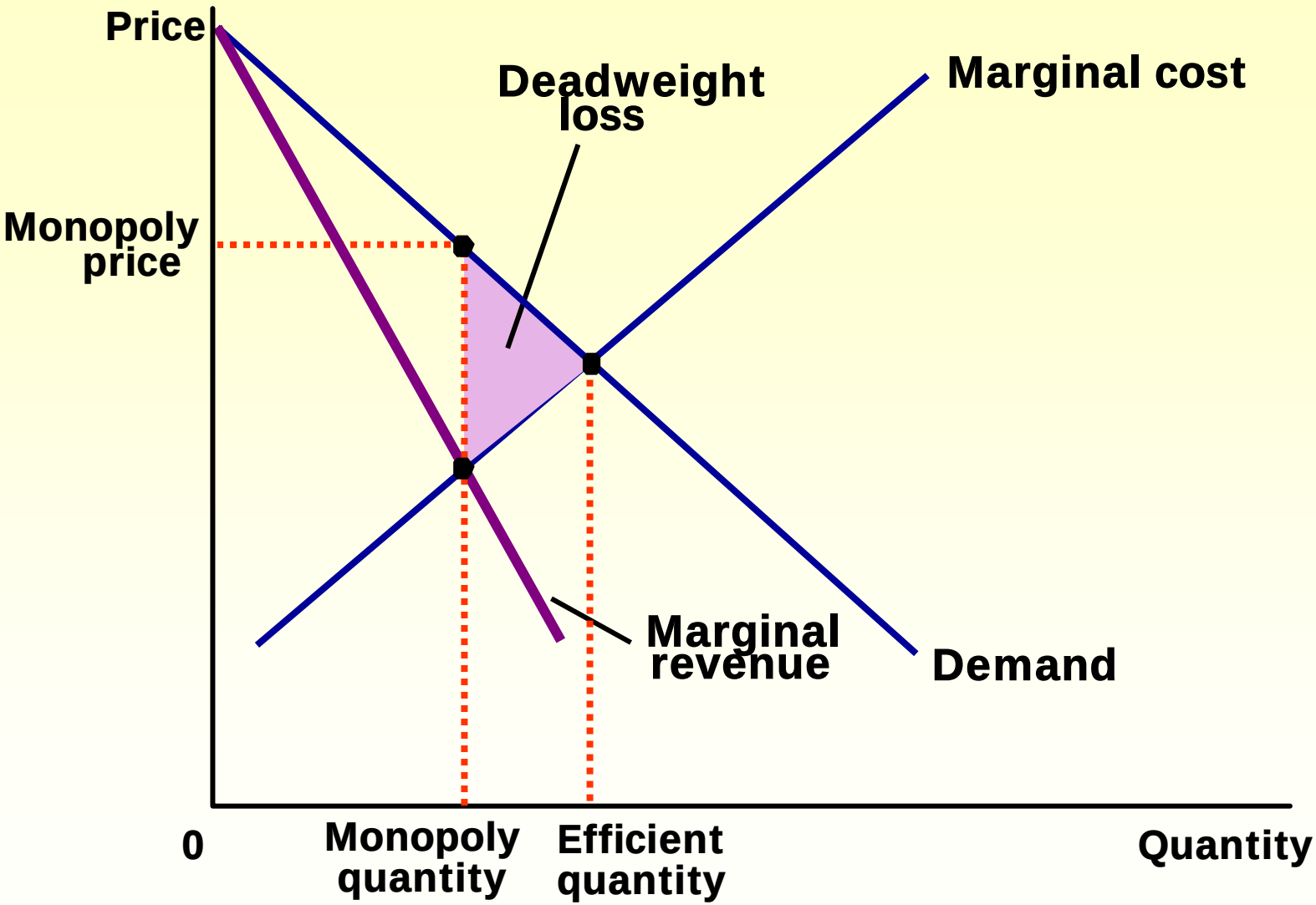
The Inefficiency of Monopoly...



The Inefficiency of Monopoly

The monopolist produces less than the socially efficient quantity of output.

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The Deadweight Loss

- The deadweight loss caused by a monopoly is similar to the deadweight loss caused by a tax.
- The difference between the two cases is that the government gets the revenue from a tax, whereas a private firm gets the monopoly profit.

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Public Policy Toward Monopolies

Government responds to the problem of monopoly in one of four ways.

- Making monopolized industries more competitive.
- Regulating the behavior of monopolies.
- Turning some private monopolies into public enterprises.
- Doing nothing at all.

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Increasing Competition with Antitrust Laws

- Antitrust laws are a collection of statutes aimed at curbing monopoly power.
- Antitrust laws give government various ways to promote competition.
  - They allow government to prevent mergers.
  - They allow government to break up companies.
  - They prevent companies from performing activities which make markets less competitive.

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Two Important Antitrust Laws

- Sherman Antitrust Act (1890)
  - Reduced the market power of the large and powerful “trusts” of that time period.
- Clayton Act (1914)
  - Strengthened the government’s powers and authorized private lawsuits.

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Regulation

Government may regulate the prices that the monopoly charges.

- **The allocation of resources will be efficient if price is set to equal marginal cost.**

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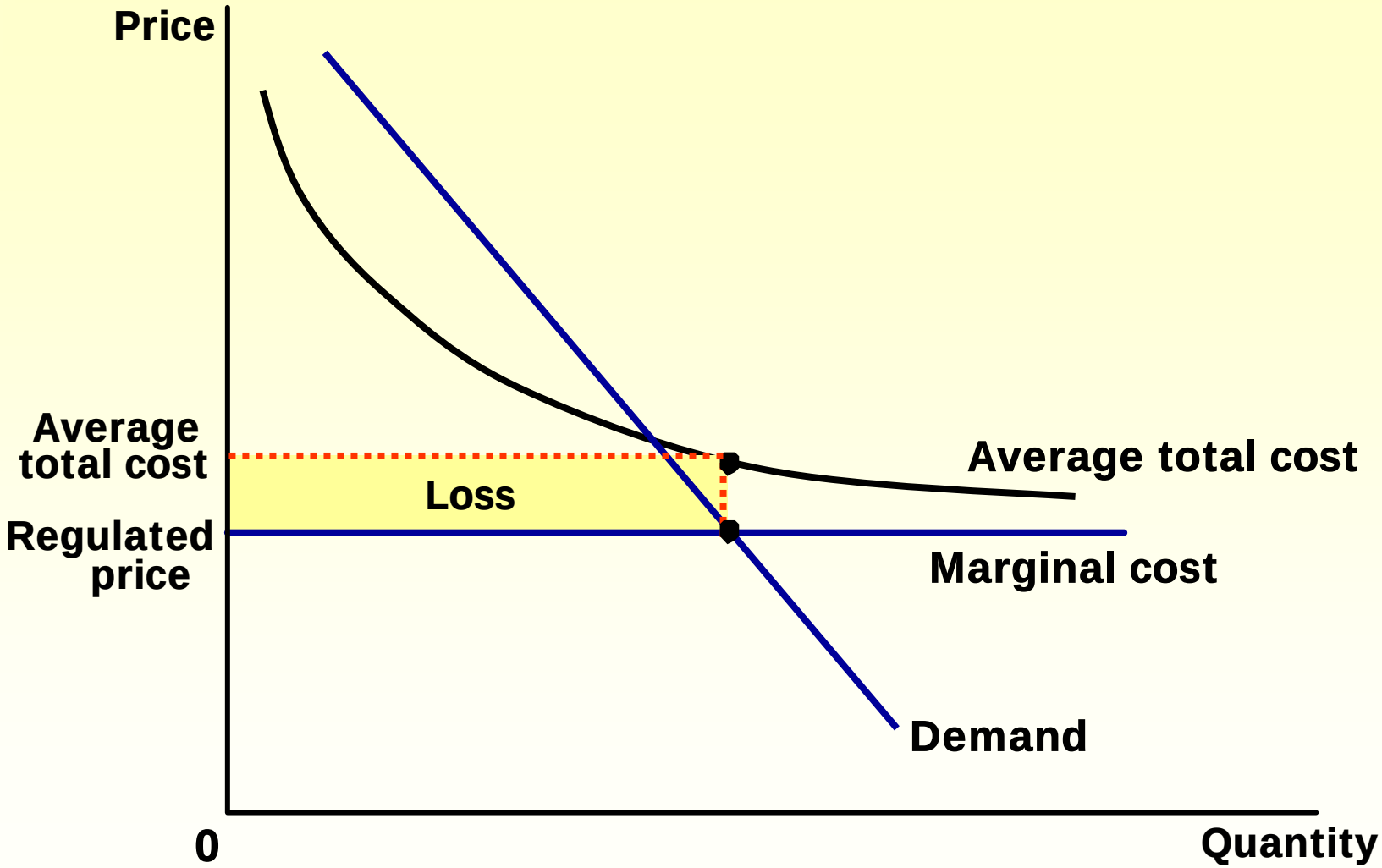
Marginal-Cost Pricing for a Natural Monopoly...



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Regulation

In practice, regulators will allow monopolists to keep some of the benefits from lower costs in the form of higher profit, a practice that requires some departure from marginal-cost pricing.

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Public Ownership

Rather than regulating a natural monopoly that is run by a private firm, the government can run the monopoly itself. (e.g. in the U.S., the government runs the Postal Service).

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Doing Nothing

Government can do nothing at all if the market failure is deemed small compared to the imperfections of public policies.

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Price Discrimination

Price discrimination is the practice of selling the same good at different prices to different customers, even though the costs for producing for the two customers are the same.

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Price Discrimination

Price discrimination is not possible when a good is sold in a competitive market since there are many firms all selling at the market price. In order to price discriminate, the firm must have some *market power*.

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Perfect Price Discrimination

Perfect price discrimination refers to the situation when the monopolist knows exactly the willingness to pay of each customer and can charge each customer a different price.

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Price Discrimination

- Two important effects of price discrimination:
  - It can increase the monopolist's profits.
  - It can reduce deadweight loss.

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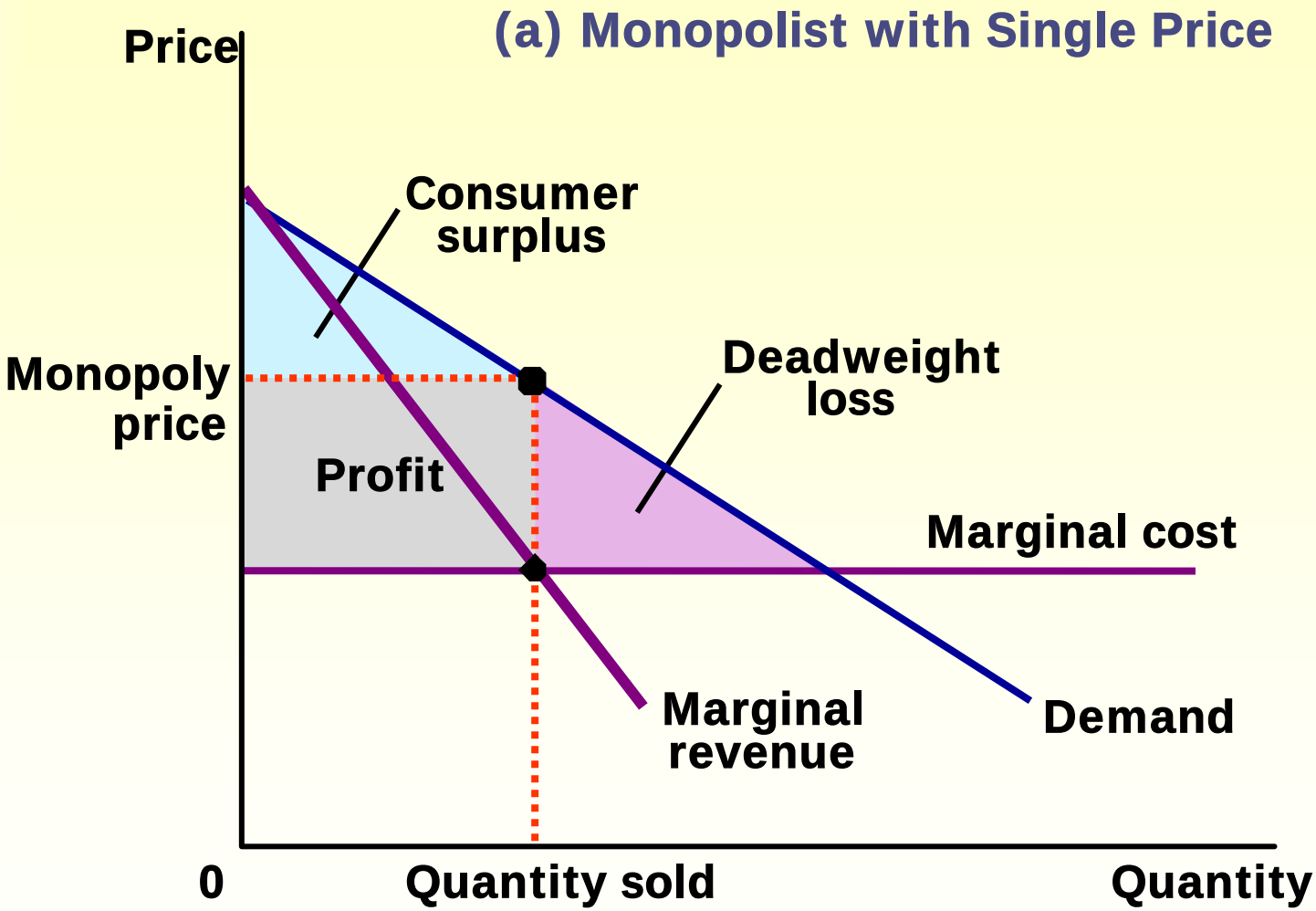
Welfare Without Price Discrimination...



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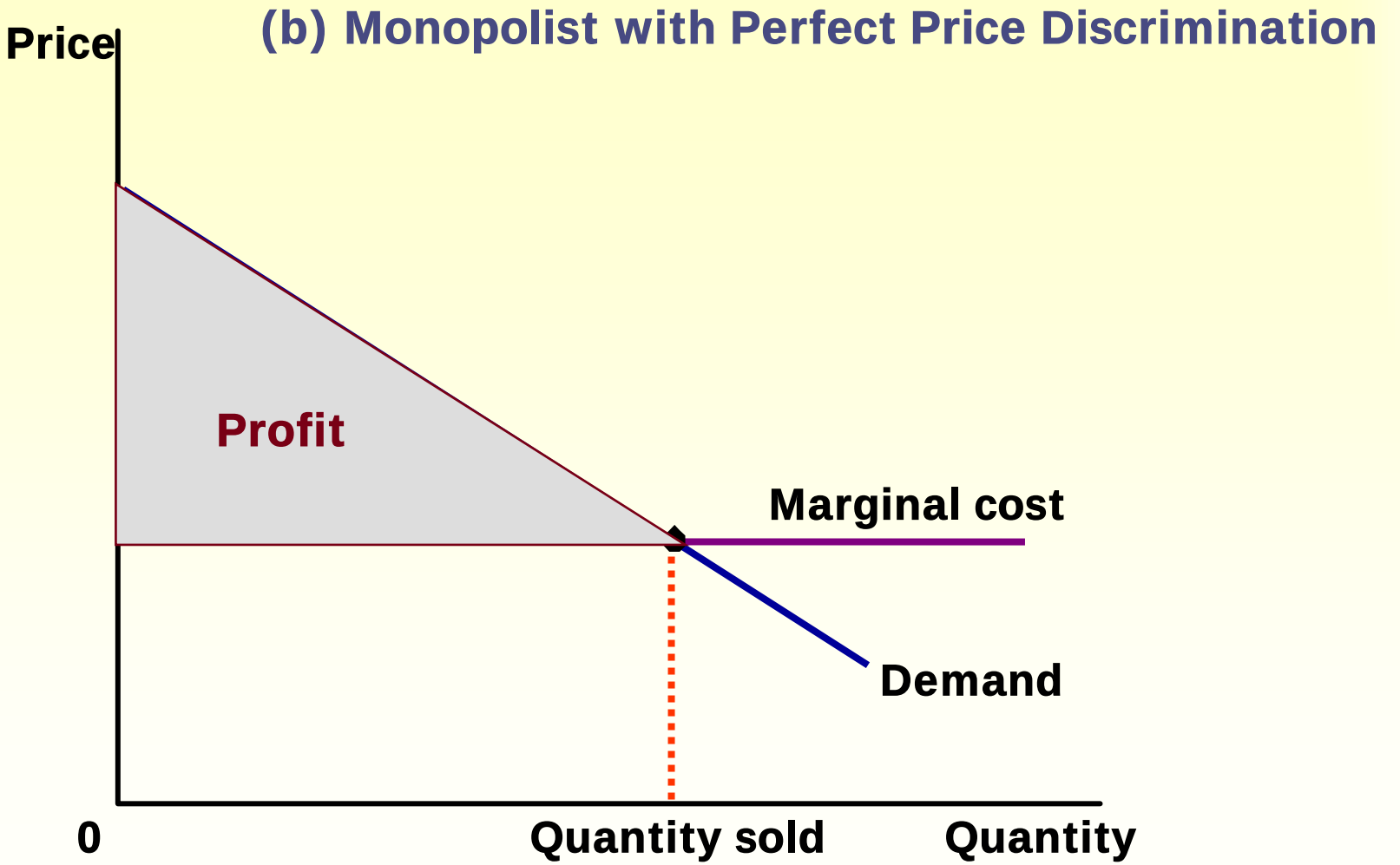

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Examples of Price Discrimination

- *Movie tickets*
- *Airline prices*
- *Discount coupons*
- *Financial aid*
- *Quantity discounts*

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The Prevalence of Monopoly

- How prevalent are the problems of monopolies?
  - Monopolies are common.
  - Most firms have some control over their prices because of differentiated products.
  - Firms with substantial monopoly power are rare.
  - Few goods are truly unique.

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Summary

- A monopoly is a firm that is the sole seller in its market.
- It faces a downward-sloping demand curve for its product.
- A monopoly's marginal revenue is always below the price of its good.

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Summary

- Like a competitive firm, a monopoly maximizes profit by producing the quantity at which marginal cost and marginal revenue are equal.
- Unlike a competitive firm, its price exceeds its marginal revenue, so its price exceeds marginal cost.

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Summary

- A monopolist's profit-maximizing level of output is below the level that maximizes the sum of consumer and producer surplus.
- A monopoly causes deadweight losses similar to the deadweight losses caused by taxes.

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Summary

- Policymakers can respond to the inefficiencies of monopoly behavior with antitrust laws, regulation of prices, or by turning the monopoly into a government-run enterprise.
- If the market failure is deemed small, policymakers may decide to do nothing at all.

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Summary

- Monopolists can raise their profits by charging different prices to different buyers based on their willingness to pay.
- Price discrimination can raise economic welfare and lessen deadweight losses.

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Graphical Review

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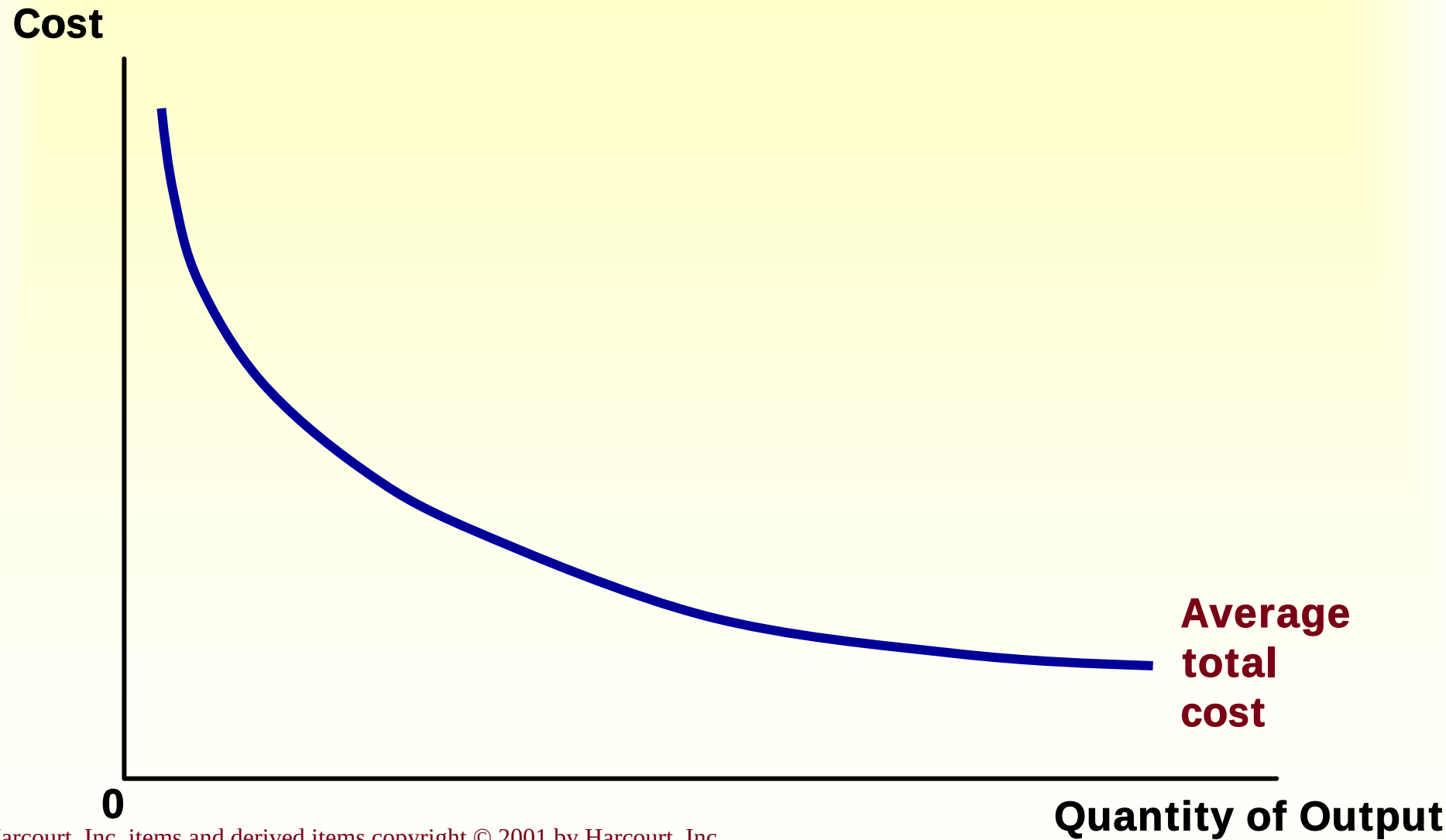

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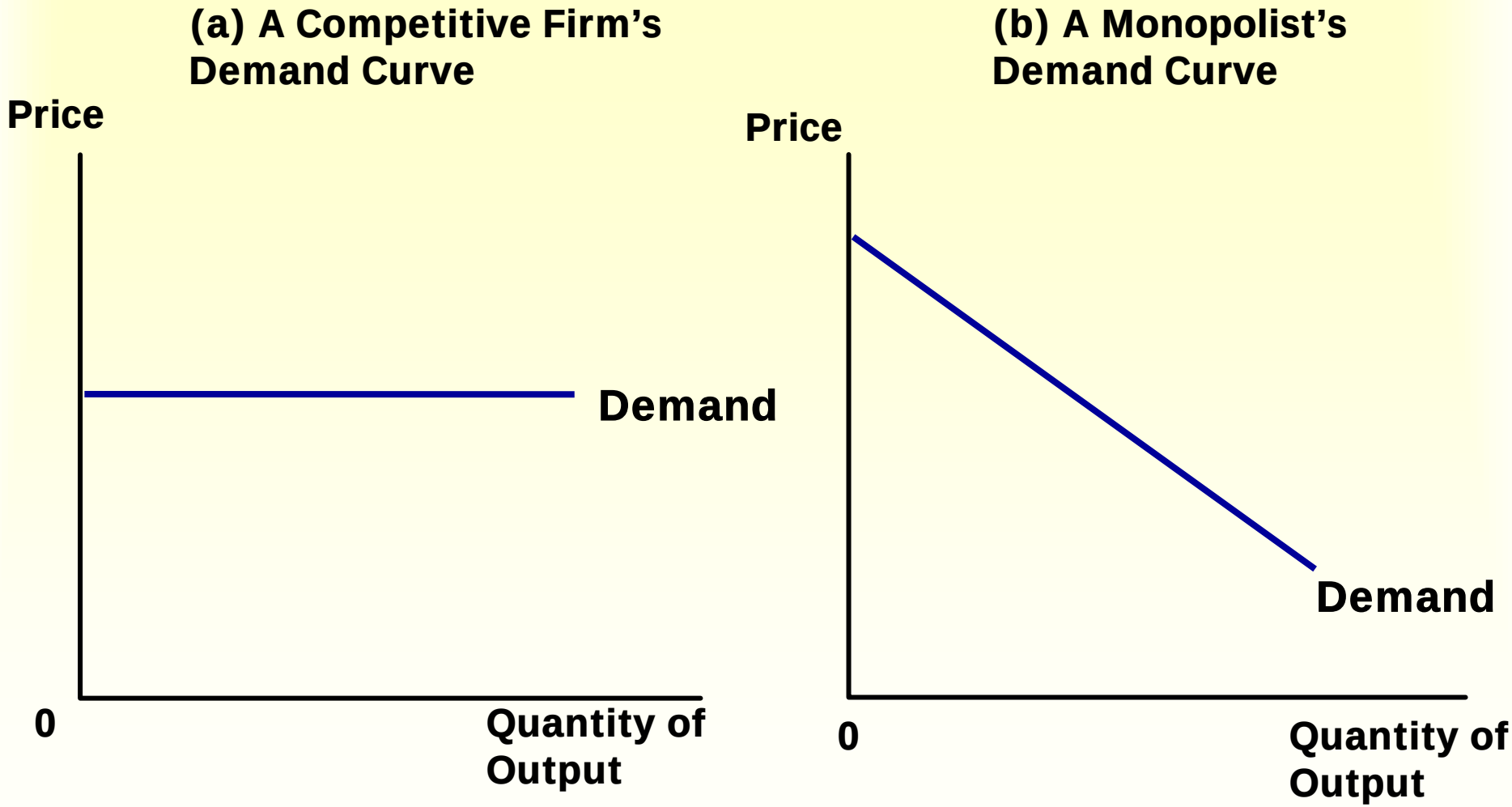
Demand Curves for Competitive and Monopoly Firms...



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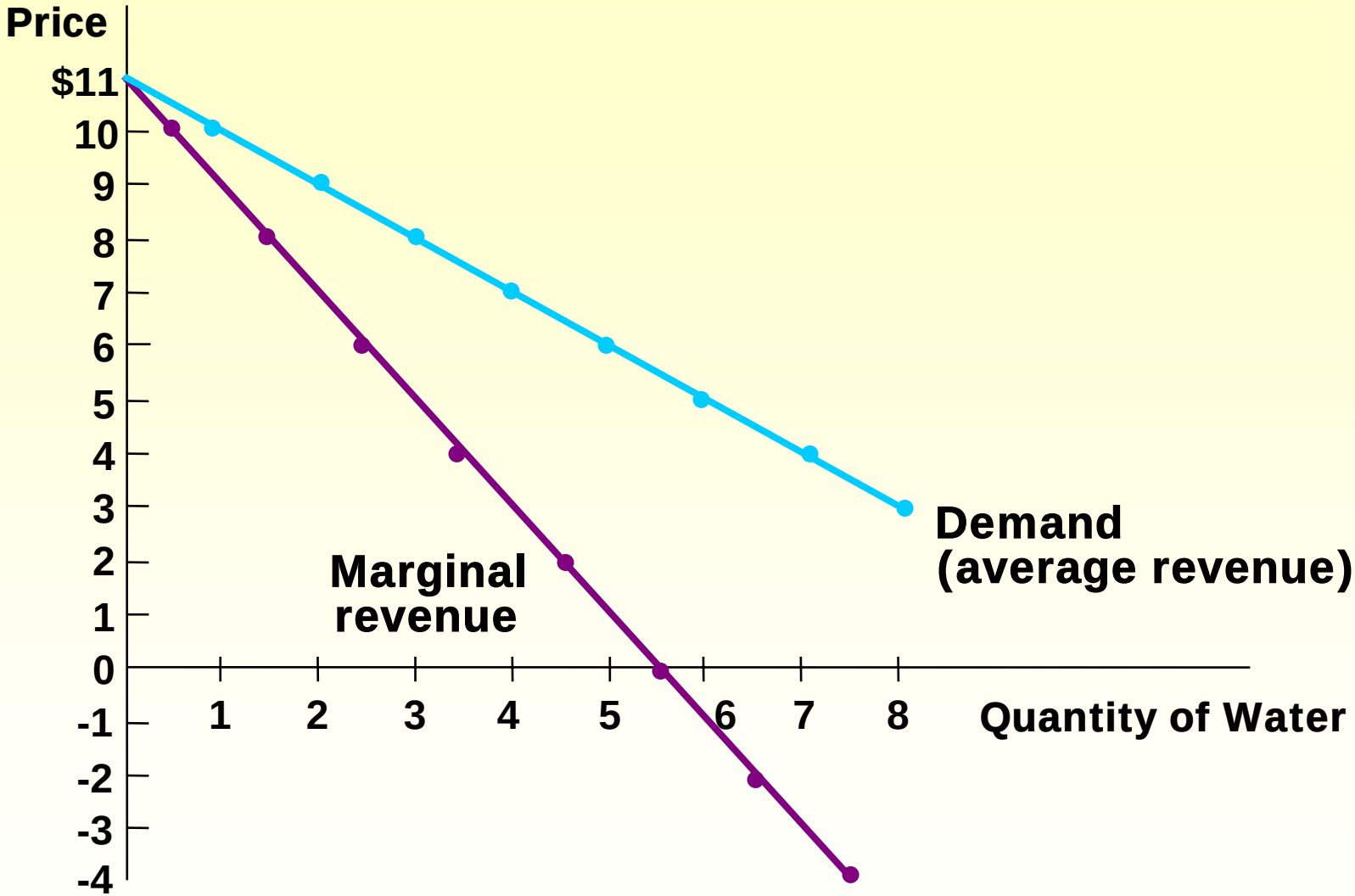
Demand and Marginal Revenue Curves for a Monopoly...



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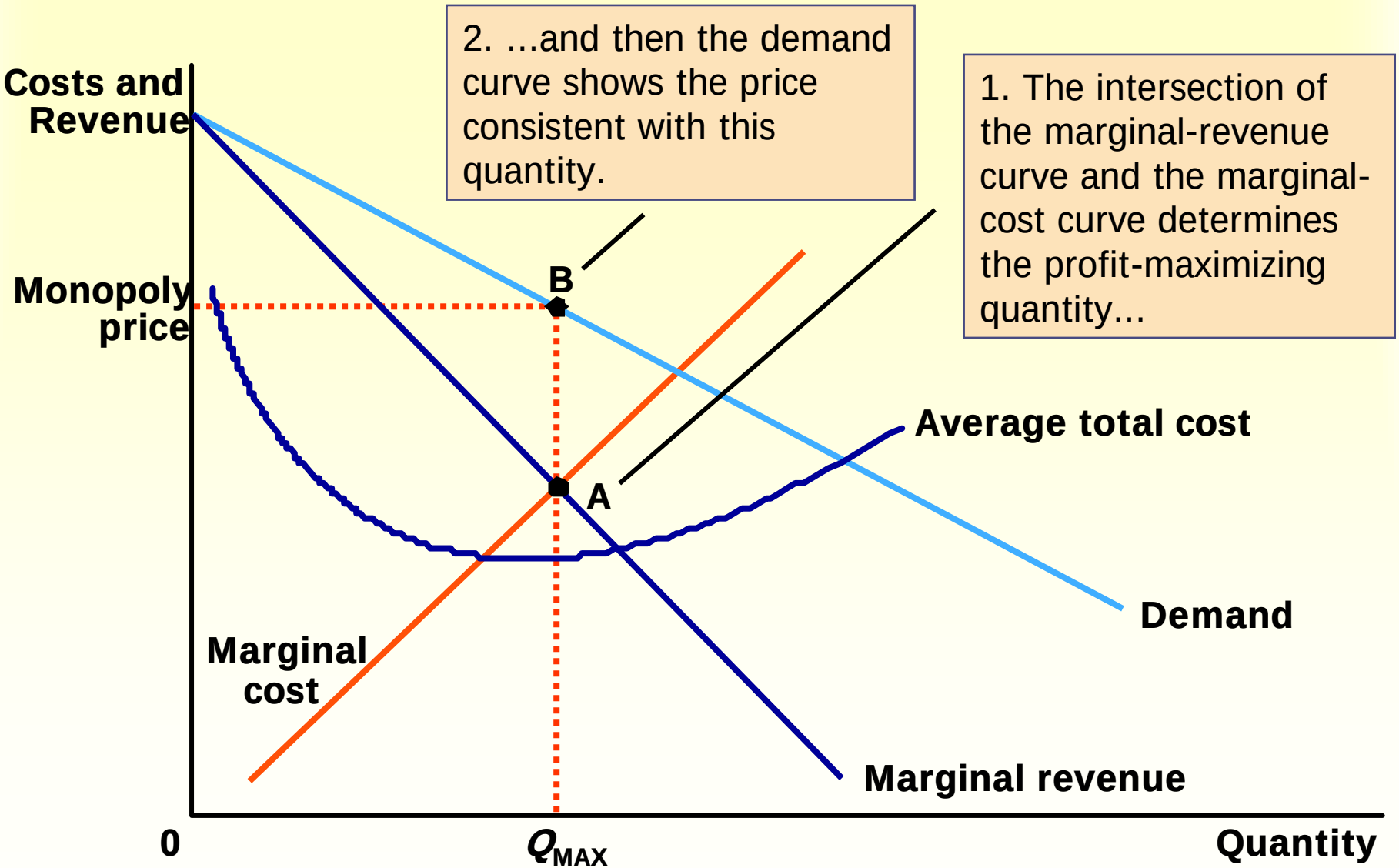

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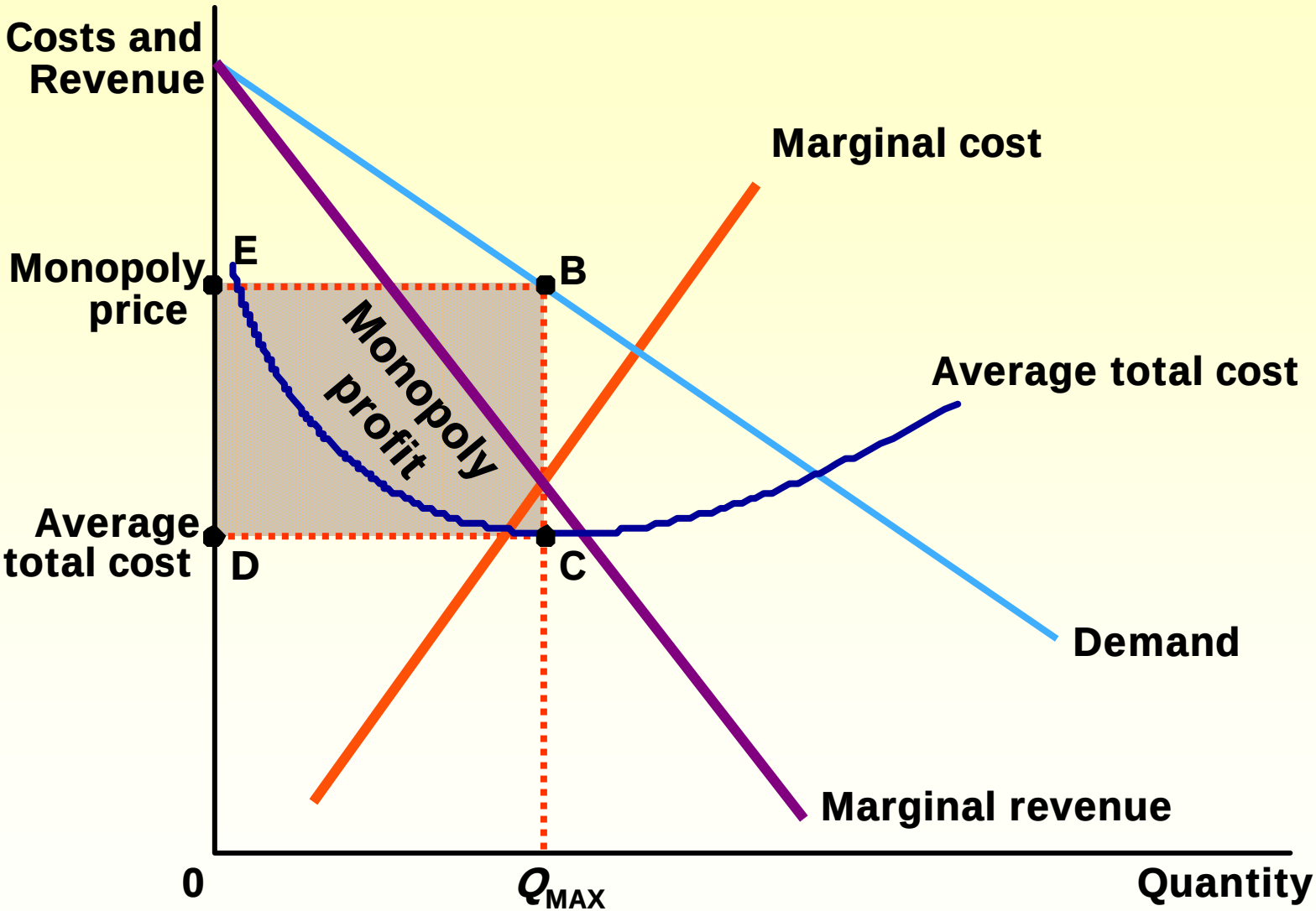
The Monopolist's Profit...



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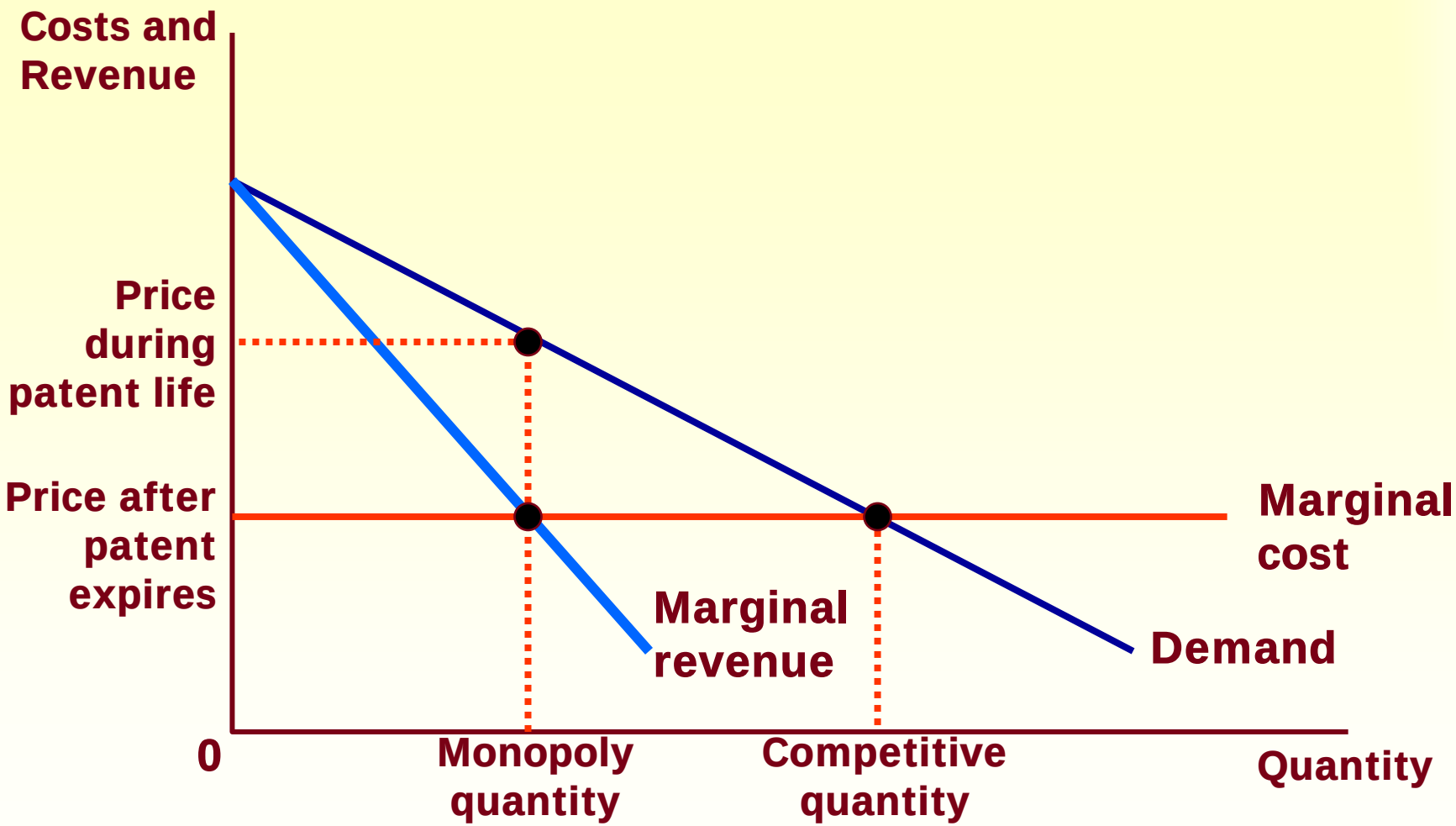

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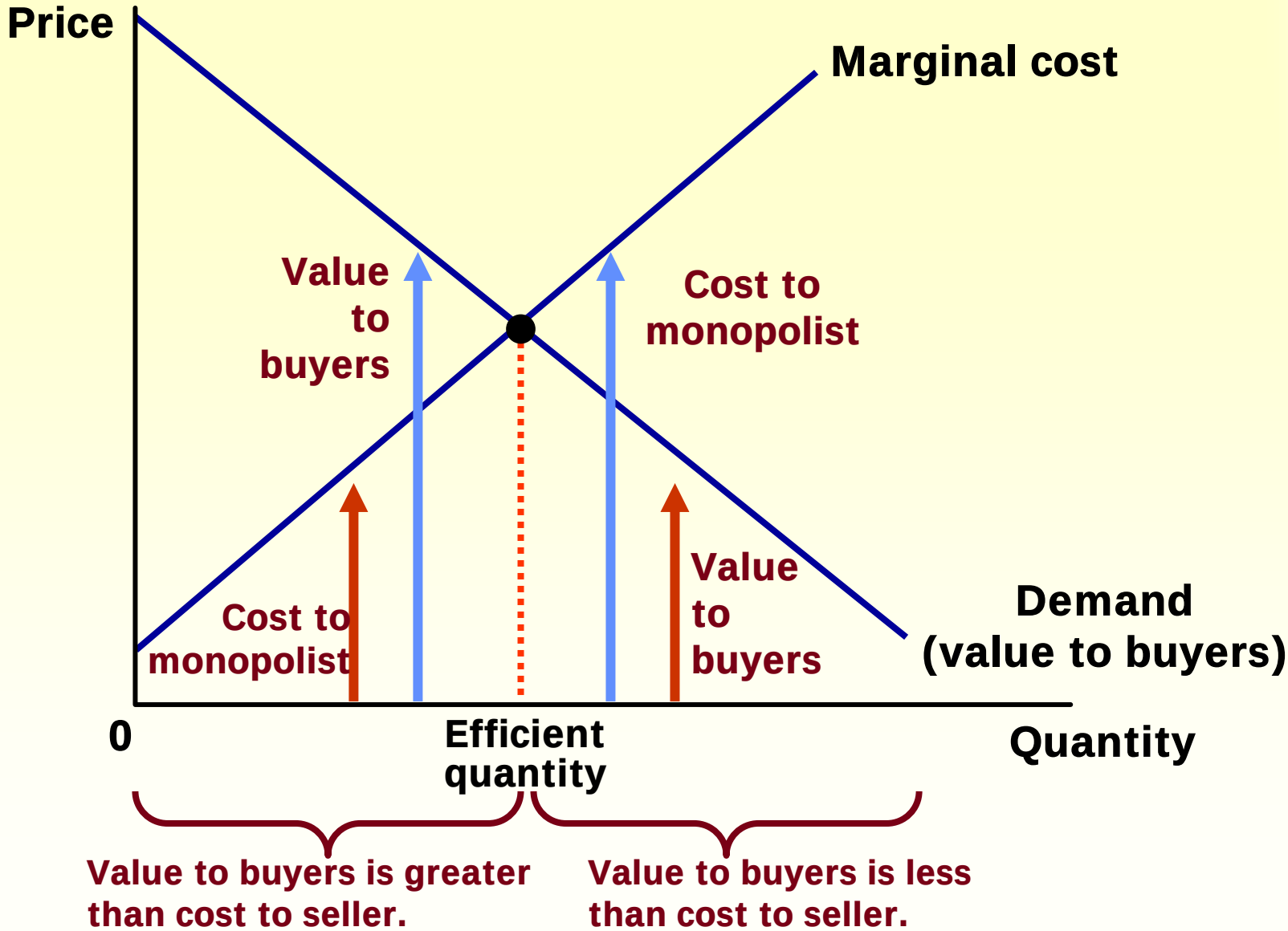
The Efficient Level of Output...



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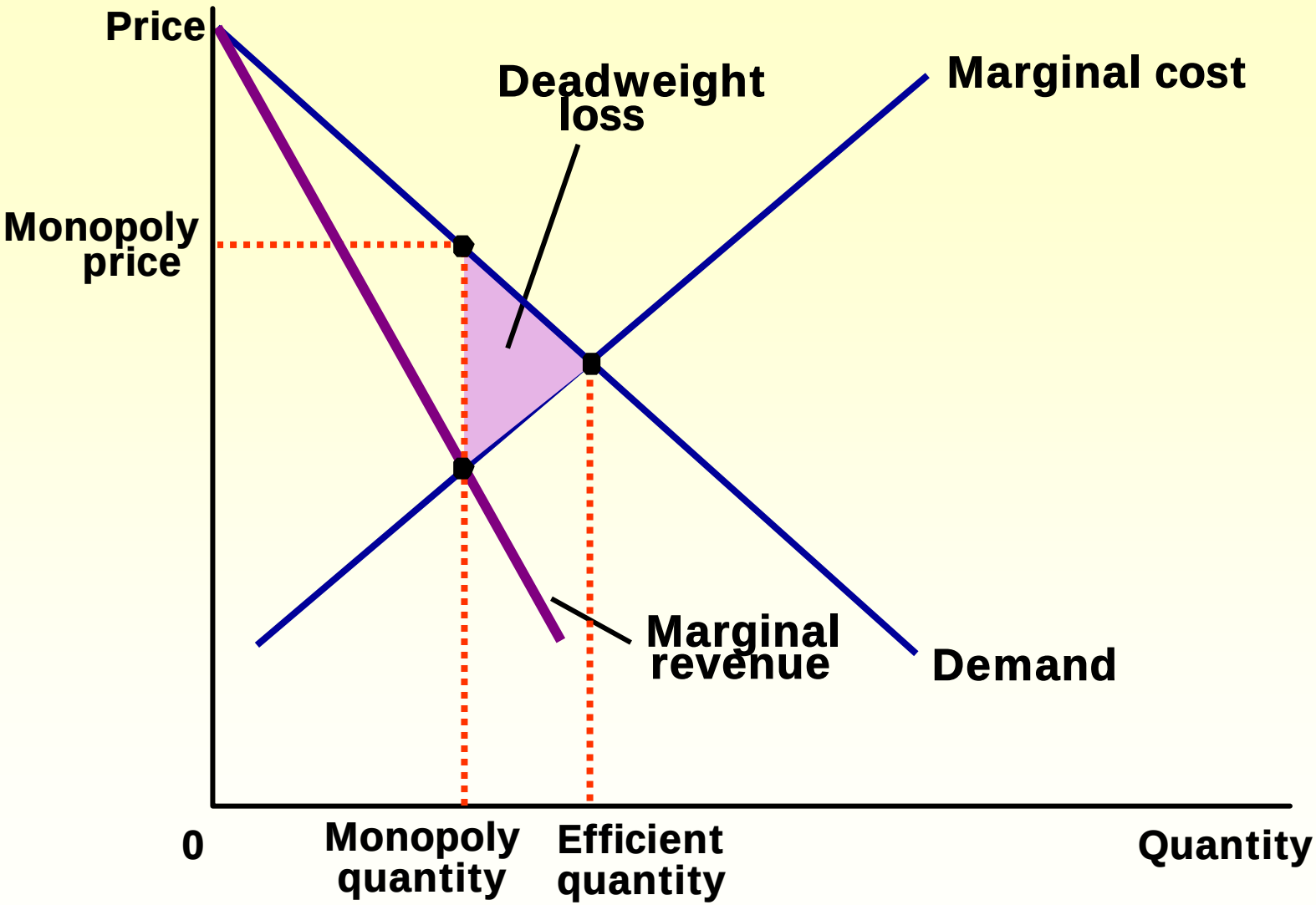
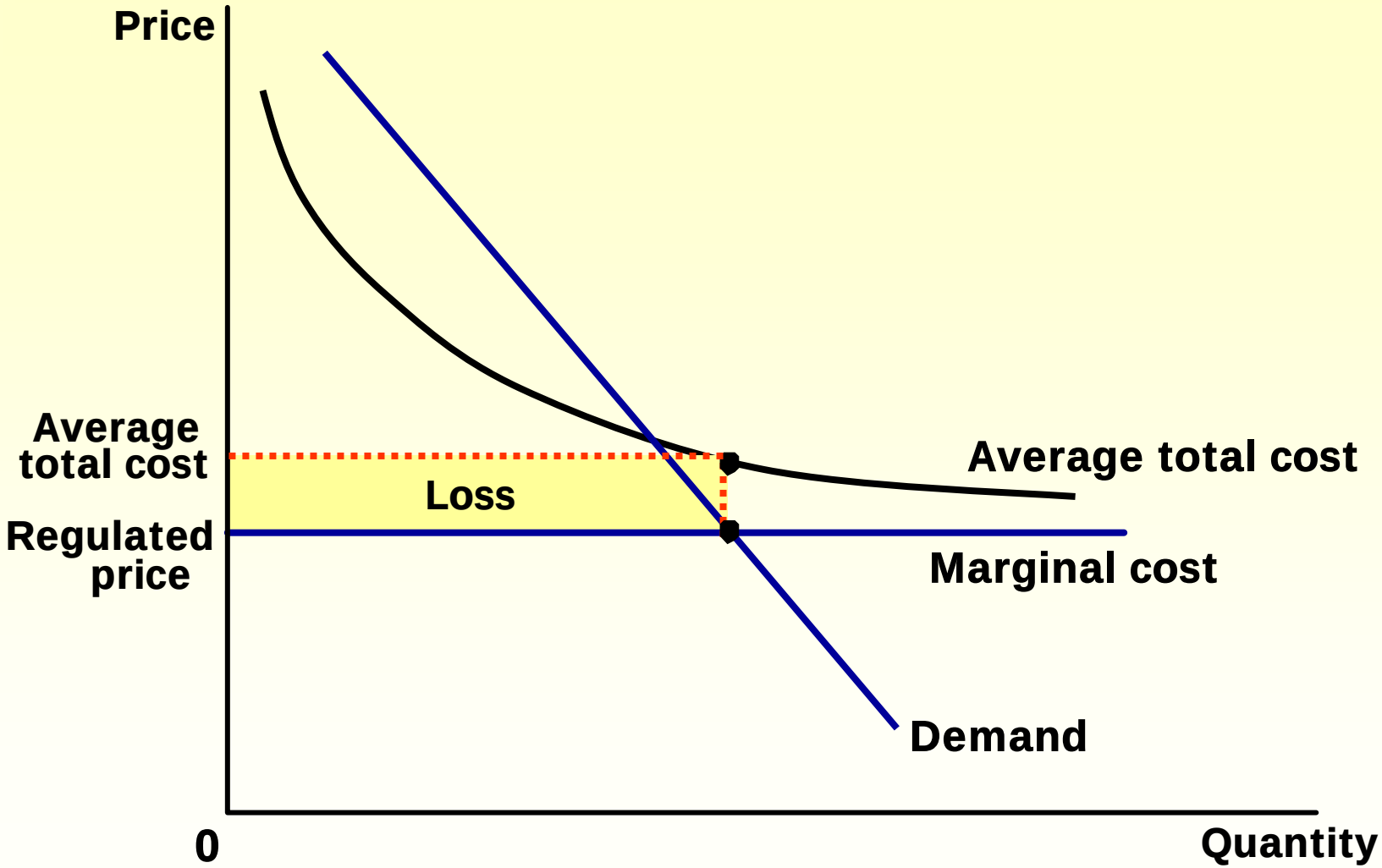
The Inefficiency of Monopoly...



Marginal-Cost Pricing for a Natural Monopoly...



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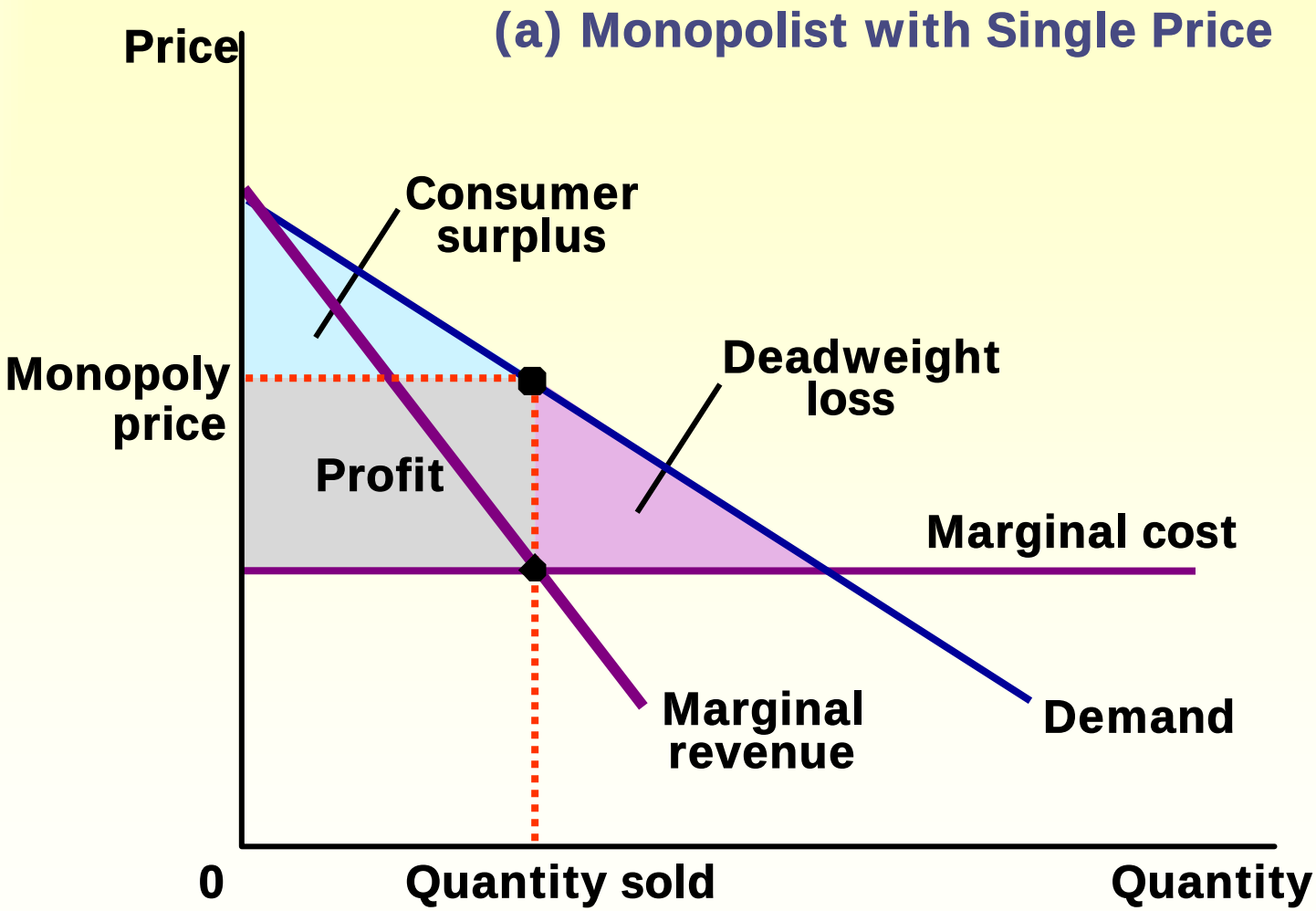
Welfare Without Price Discrimination...



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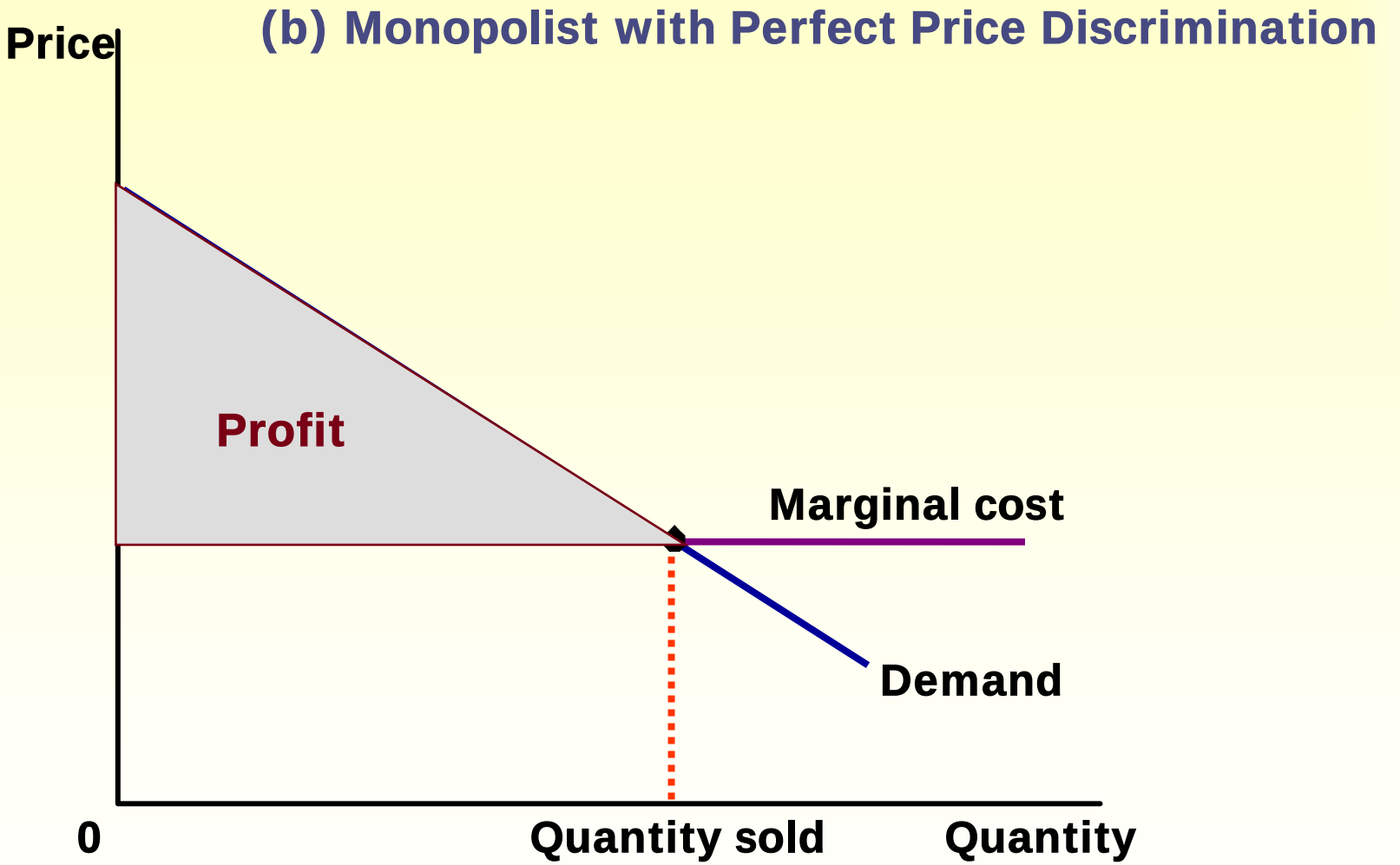

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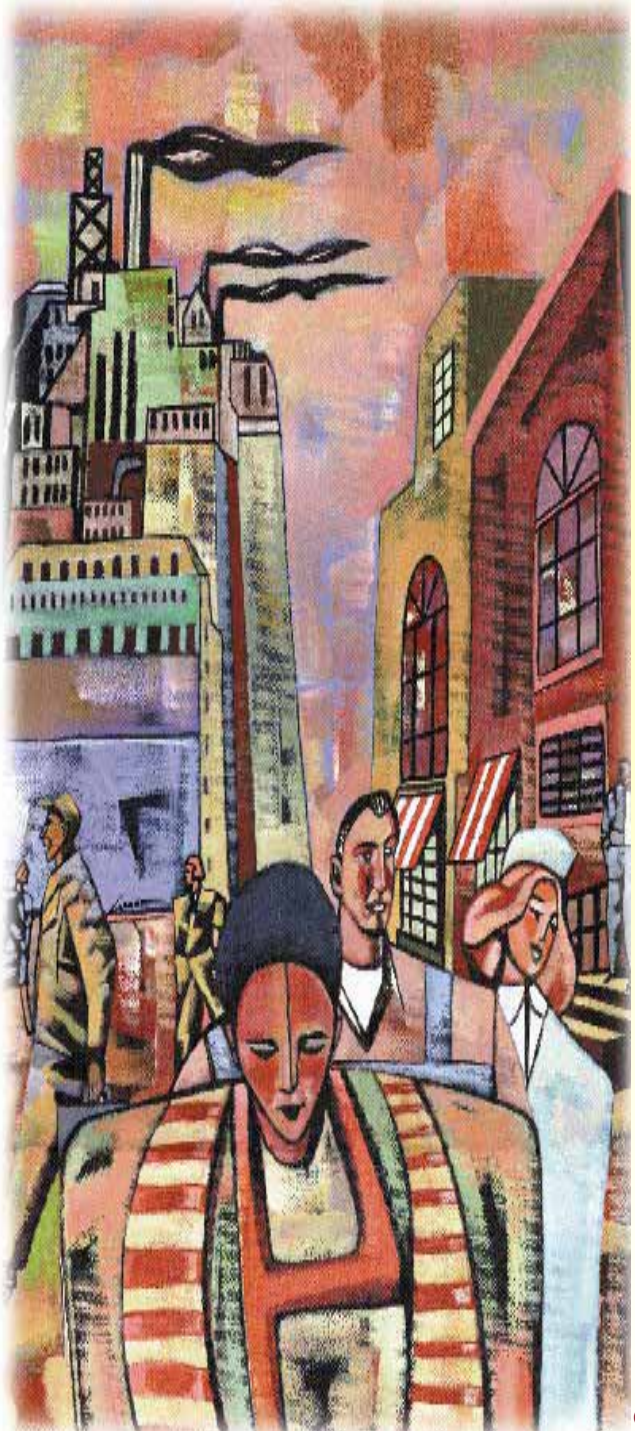

Oligopoly

Chapter 16

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Imperfect Competition

Imperfect competition refers to those market structures that fall between perfect competition and pure monopoly.

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Imperfect Competition

Imperfect competition includes industries in which firms have competitors but do not face so much competition that they are price takers.

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Types of Imperfectly Competitive Markets

- **Oligopoly**
  - Only a *few sellers*, each offering a similar or identical product to the others.
- **Monopolistic Competition**
  - *Many firms* selling products that are similar but not identical.

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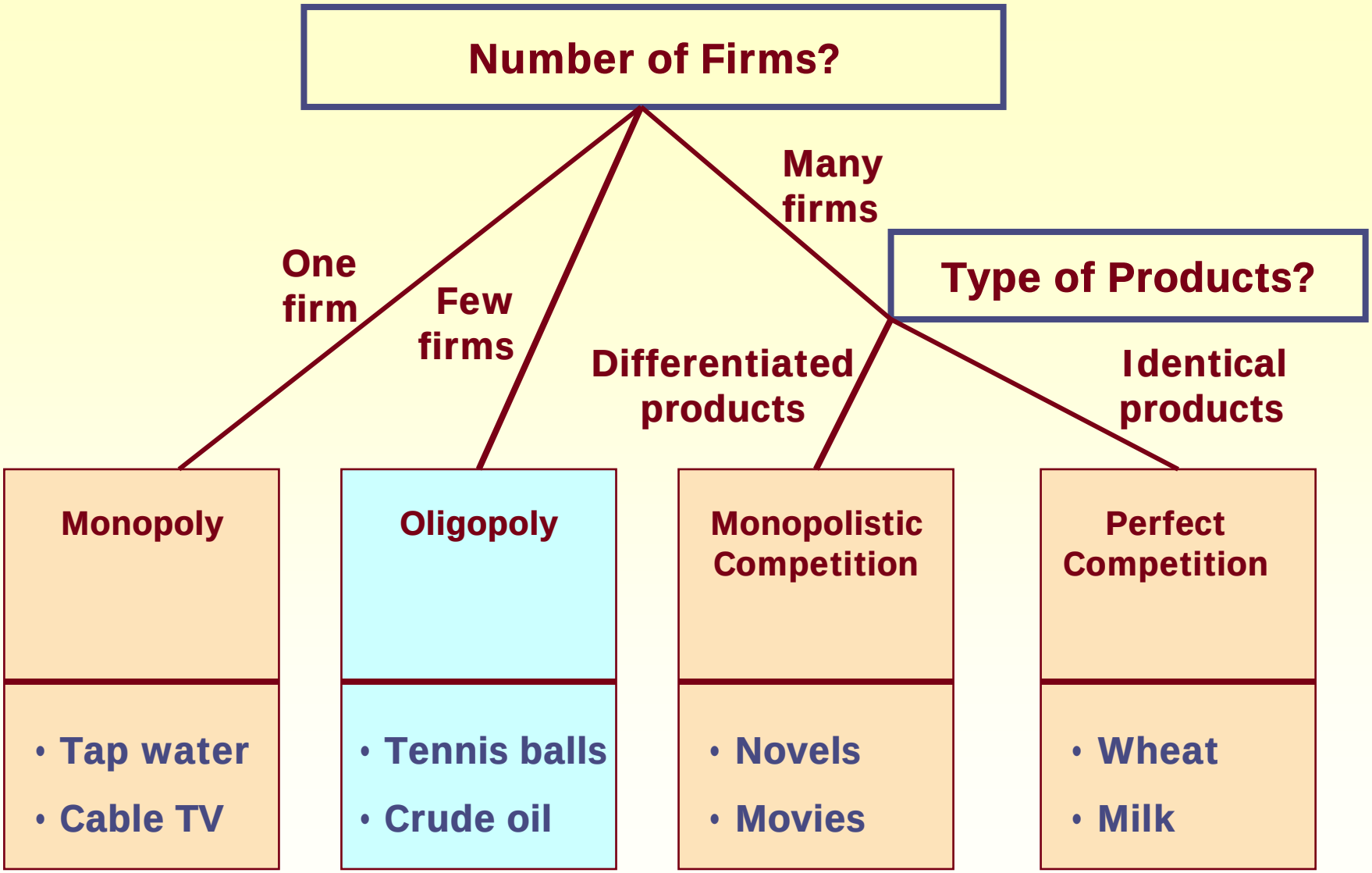
The Four Types of Market Structure



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Markets With Only a Few Sellers

Because of the few sellers, the key feature of oligopoly is the tension between cooperation and self-interest.

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Characteristics of an Oligopoly Market

- Few sellers offering similar or identical products
- Interdependent firms
- Best off cooperating and acting like a monopolist by producing a small quantity of output and charging a price above marginal cost

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A Duopoly Example

A duopoly is an oligopoly with only two members. It is the simplest type of oligopoly.

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A Duopoly Example: Demand Schedule for Water

Quantity	Price	Total Revenue
0	$120	$ 0
10	110	1,100
20	100	2,000
30	90	2,700
40	80	3,200
50	70	3,500
60	60	3,600
70	50	3,500
80	40	3,200
90	30	2,700
100	20	2,000
110	10	1,100
120	0	0

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A Duopoly Example: Price and Quantity Supplied

- The price of water in a perfectly competitive market would be driven to where the marginal cost is zero:

$$P = MC = \$0$$

$$Q = 120 \text{ gallons}$$

- The price and quantity in a monopoly market would be where total profit is maximized:

$$P = \$60$$

$$Q = 60 \text{ gallons}$$

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A Duopoly Example: Price and Quantity Supplied

- The socially efficient quantity of water is 120 gallons, but a monopolist would produce only 60 gallons of water.
- So what outcome then could be expected from duopolists?

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Competition, Monopolies, and Cartels

- The **duopolists** may agree on a monopoly outcome.
  - **Collusion**
    - The two firms may agree on the quantity to produce and the price to charge.
  - **Cartel**
    - The two firms may join together and act in unison.

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Competition, Monopolies, and Cartels

Although oligopolists would like to form cartels and earn monopoly profits, often that is not possible. Antitrust laws prohibit explicit agreements among oligopolists as a matter of public policy.

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The Equilibrium for an Oligopoly

A Nash equilibrium is a situation in which economic actors interacting with one another each choose their best strategy given the strategies that all the others have chosen.

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The Equilibrium for an Oligopoly

When firms in an oligopoly individually choose production to maximize profit, they produce quantity of output greater than the level produced by monopoly and less than the level produced by competition.

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The Equilibrium for an Oligopoly

The oligopoly price is less than the monopoly price but greater than the competitive price (which equals marginal cost).

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Summary of Equilibrium for an Oligopoly

- Possible outcome if oligopoly firms pursue their own self-interests:
  - Joint output is greater than the monopoly quantity but less than the competitive industry quantity.
  - Market prices are lower than monopoly price but greater than competitive price.
  - Total profits are less than the monopoly profit.

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A Duopoly Example: Demand Schedule for Water

Quantity	Price	Total Revenue
0	$120	$ 0
10	110	1,100
20	100	2,000
30	90	2,700
40	80	3,200
50	70	3,500
60	60	3,600
70	50	3,500
80	40	3,200
90	30	2,700
100	20	2,000
110	10	1,100
120	0	0

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How the Size of an Oligopoly Affects the Market Outcome

- How increasing the number of sellers affects the price and quantity:
  - The **output effect**: Because price is above marginal cost, selling more at the going price raises profits.
  - The **price effect**: Raising production lowers the price and the profit per unit on all units sold.

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How the Size of an Oligopoly Affects the Market Outcome

- As the number of sellers in an oligopoly grows larger, an oligopolistic market looks more and more like a competitive market.
- The price approaches marginal cost, and the quantity produced approaches the socially efficient level.

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Game Theory and the Economics of Cooperation

- **Game theory** is the study of how people behave in strategic situations.
- **Strategic decisions** are those in which each person, in deciding what actions to take, must consider how others might respond to that action.

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Game Theory and the Economics of Cooperation

- Because the number of firms in an oligopolistic market is small, each firm must act strategically.
- Each firm knows that its profit depends not only on how much it produced but also on how much the other firms produce.

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The Prisoners' Dilemma

The prisoners' dilemma provides insight into the difficulty in maintaining cooperation.

Often people (firms) fail to cooperate with one another even when cooperation would make them better off.

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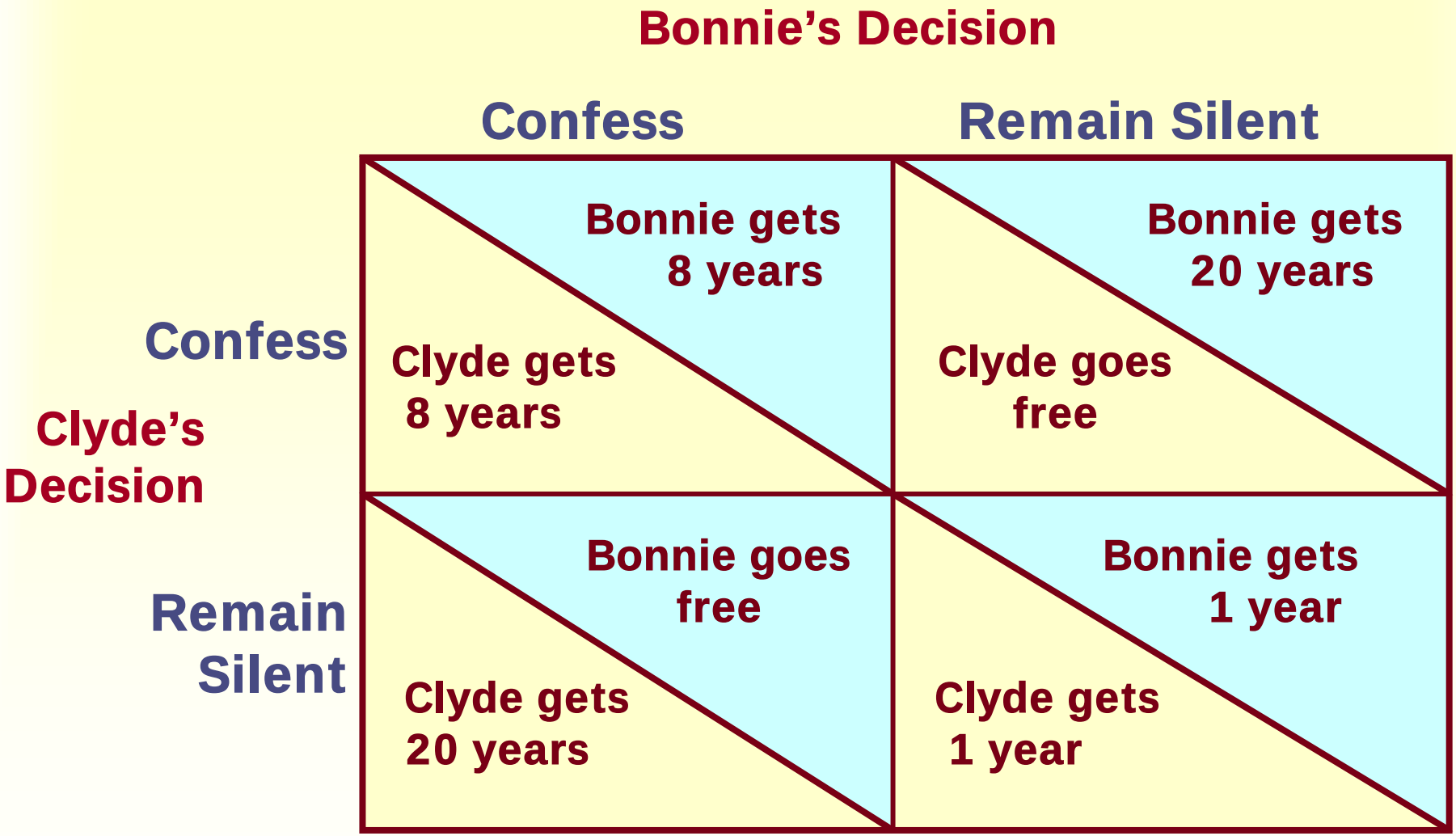
The Prisoners' Dilemma



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The Prisoners' Dilemma

The dominant strategy is the best strategy for a player to follow regardless of the strategies pursued by other players.

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The Prisoners' Dilemma

Cooperation is difficult to maintain, because cooperation is not in the best interest of the individual player.

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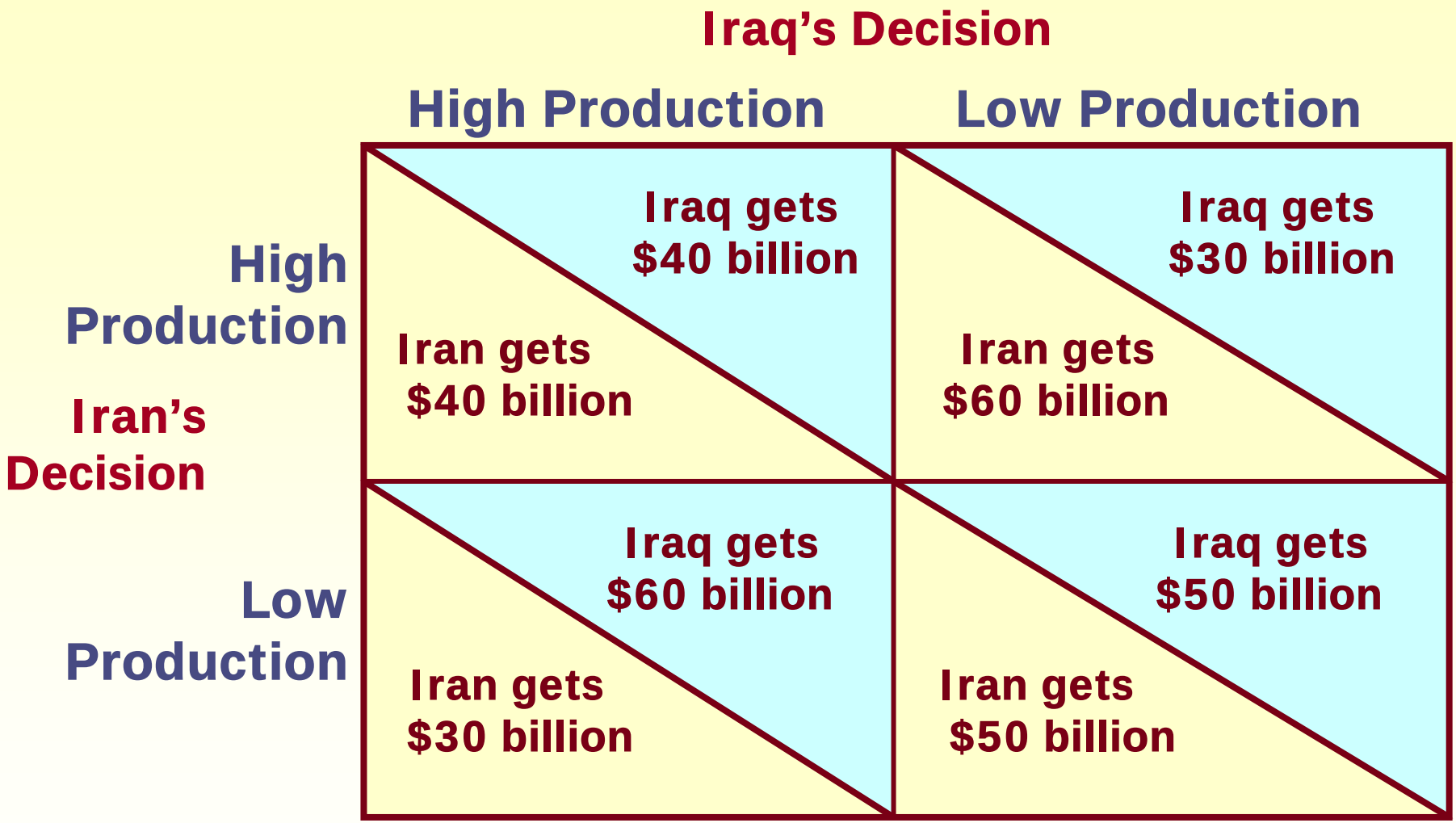
Oligopolies as a Prisoners' Dilemma



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Oligopolies as a Prisoners' Dilemma

Self-interest makes it difficult for the oligopoly to maintain a cooperative outcome with low production, high prices, and monopoly profits.

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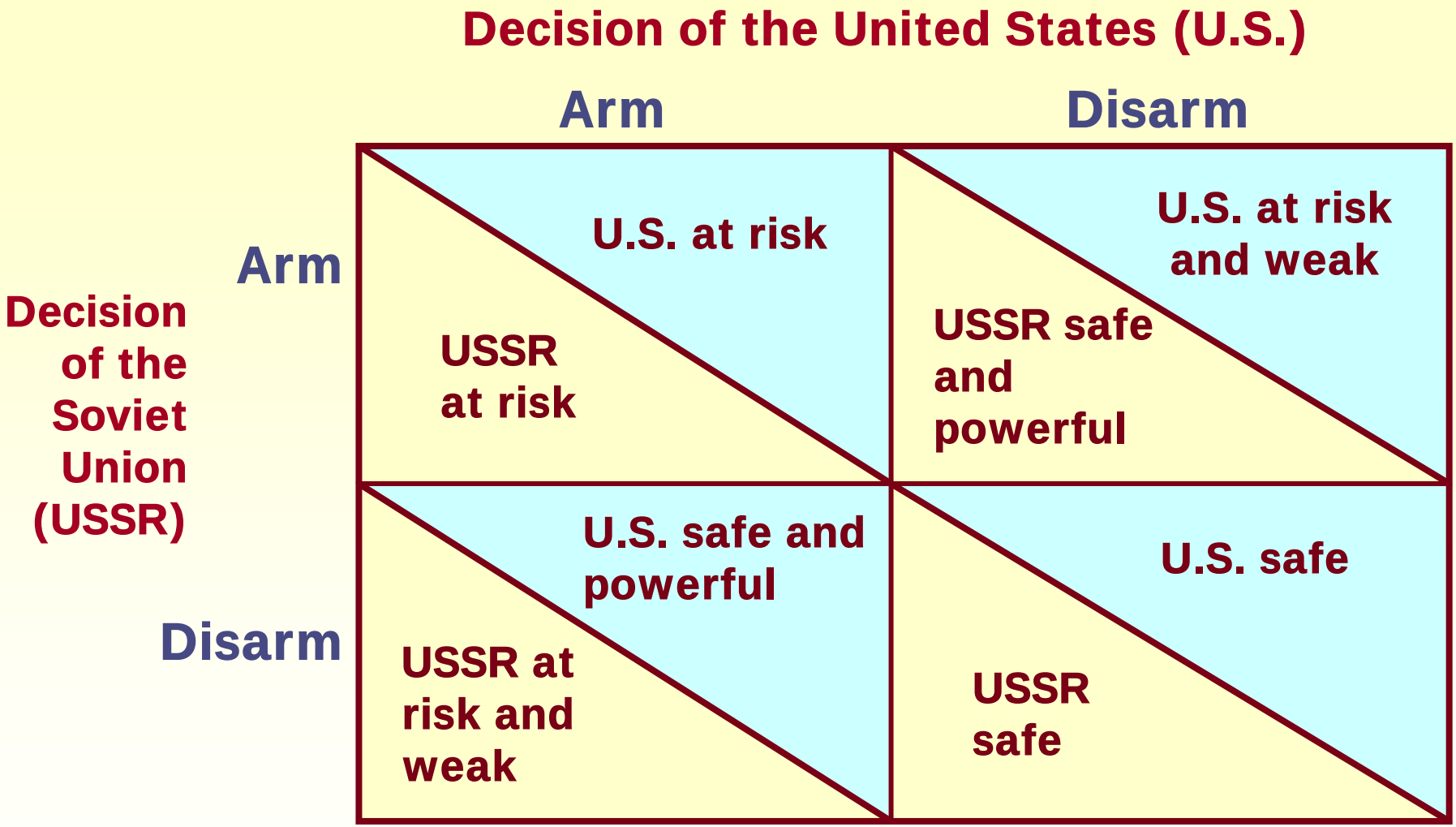
An Arms-Race Game



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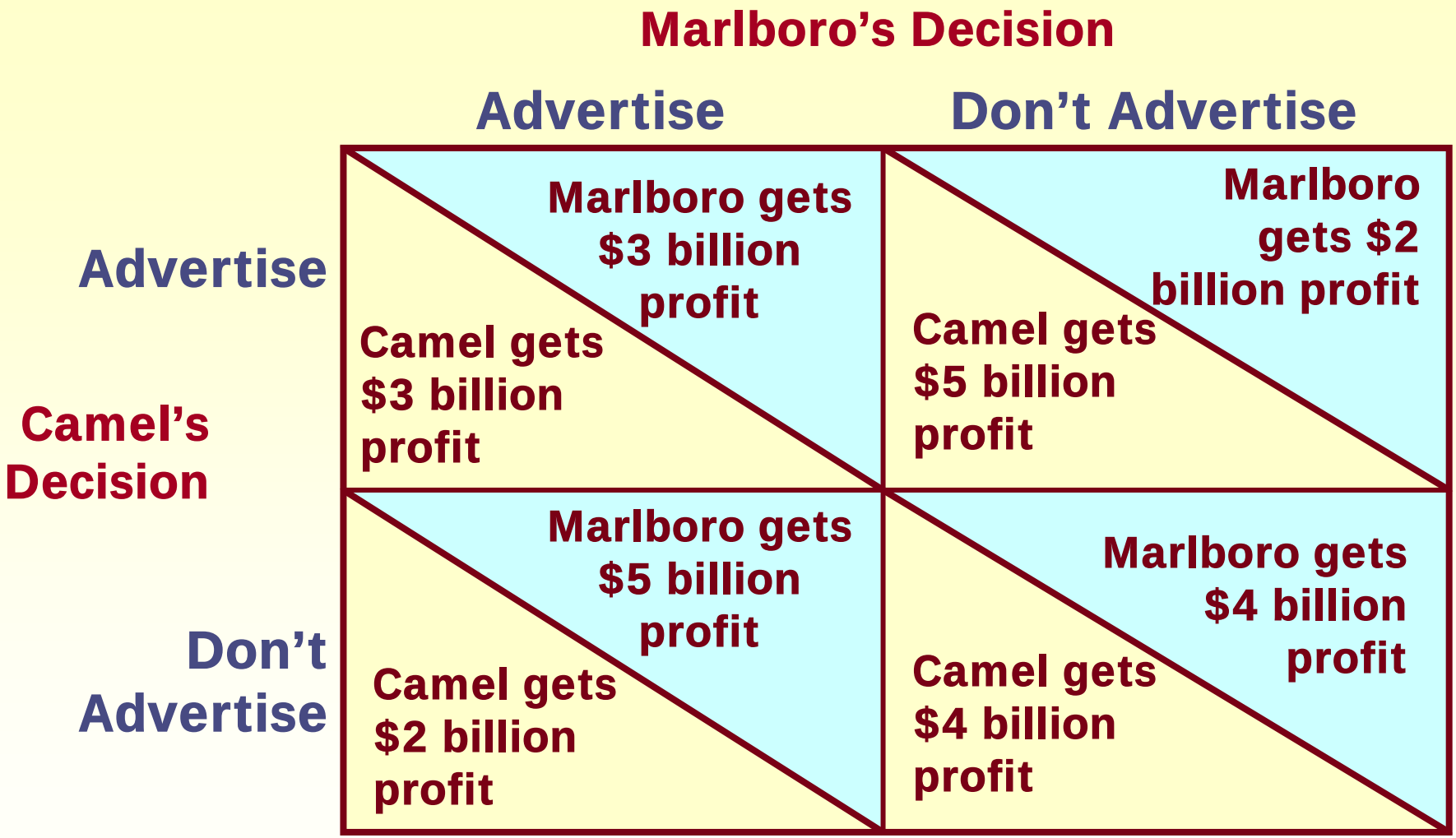
An Advertising Game



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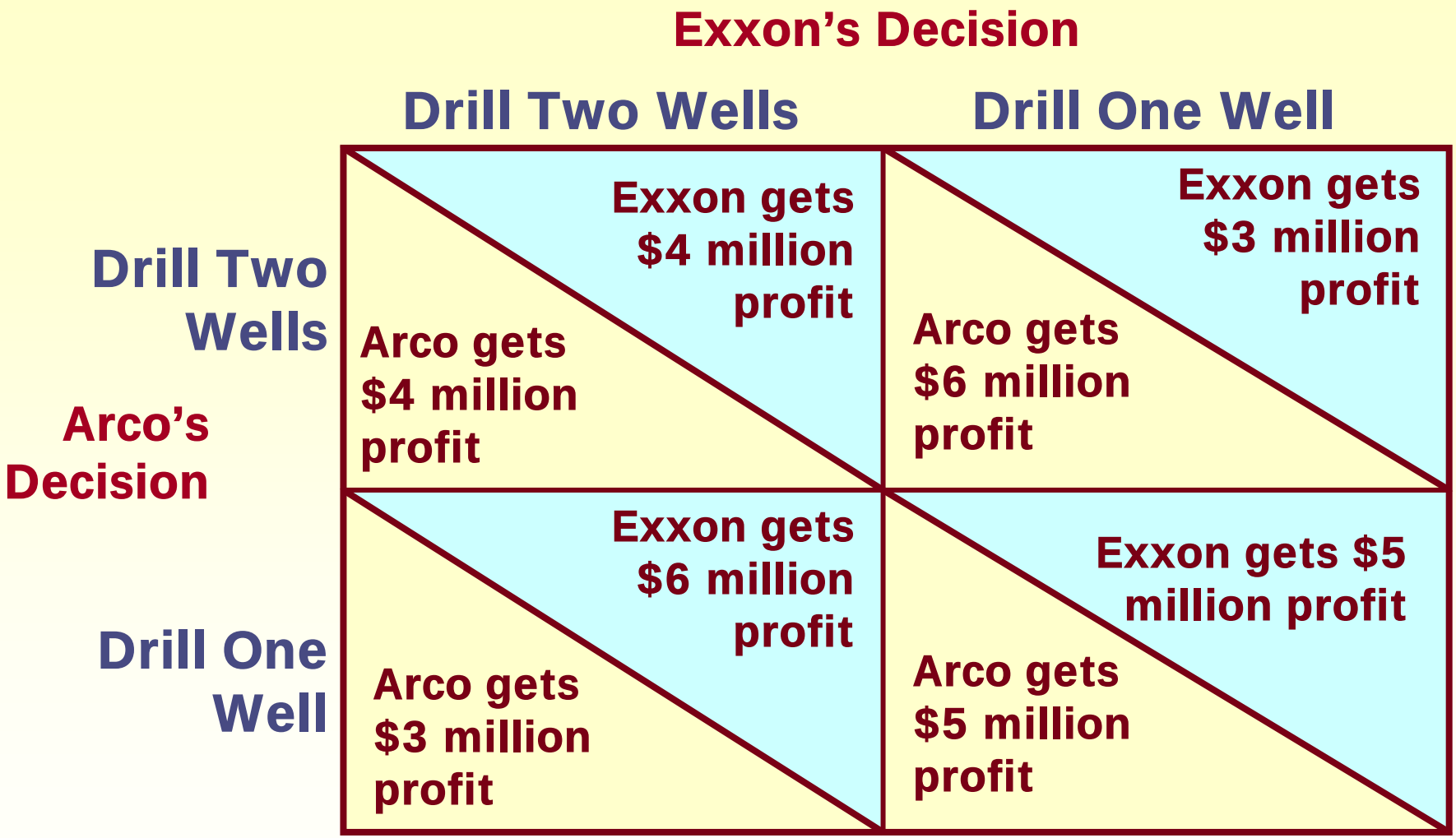
A Common-Resources Game



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Why People Sometimes Cooperate

Firms that care about future profits will cooperate in repeated games rather than cheating in a single game to achieve a one-time gain.

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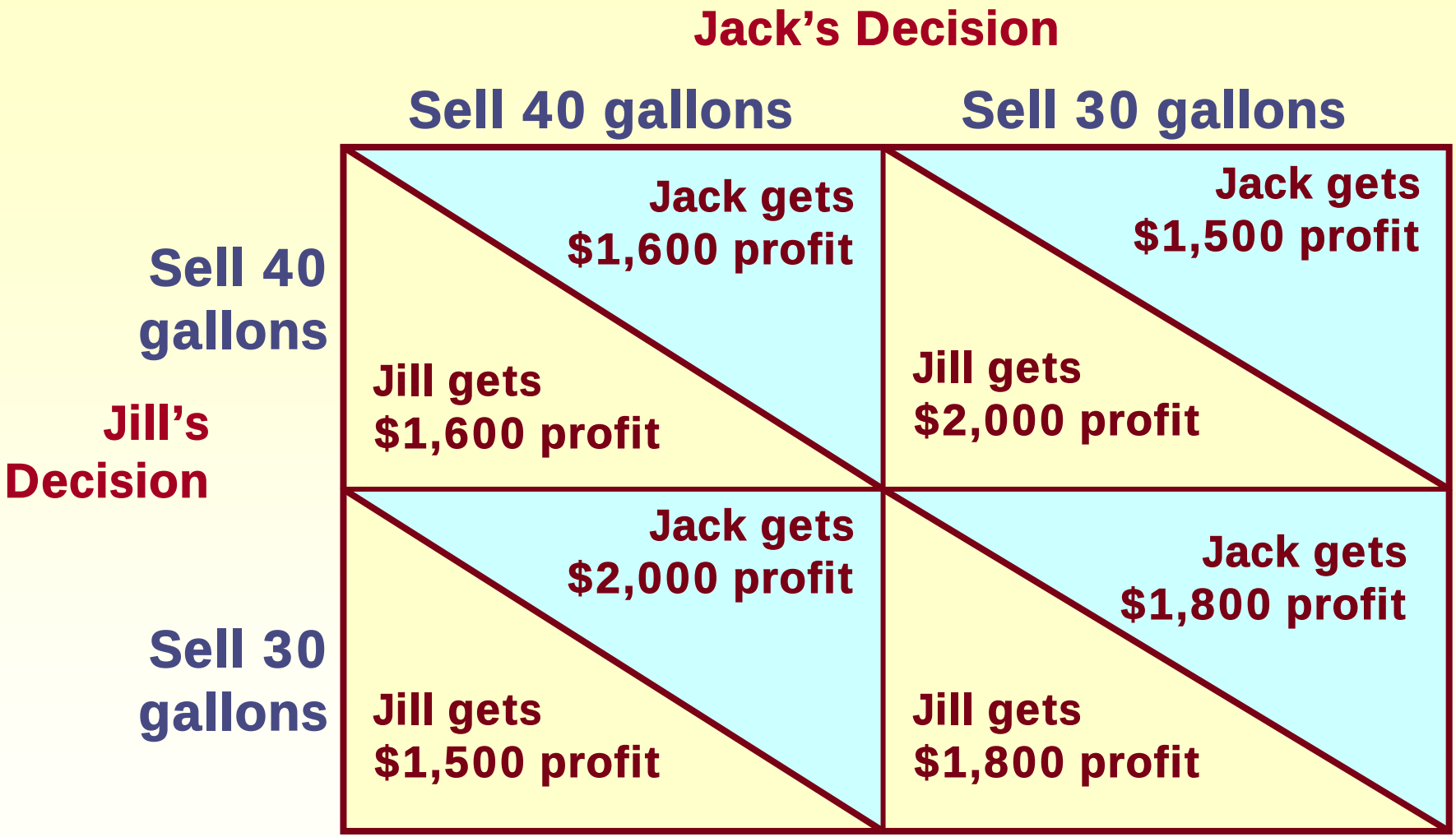
Jack and Jill's Oligopoly Game



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Public Policy Toward Oligopolies

Cooperation among oligopolists is undesirable from the standpoint of society as a whole because it leads to *production that is too low* and *prices that are too high*.

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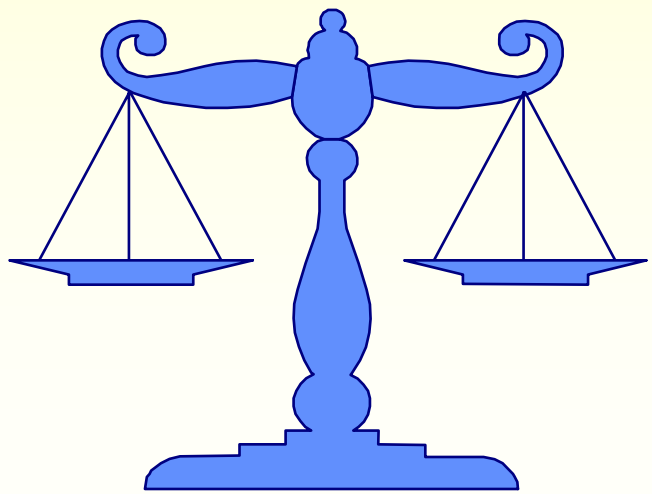
Restraint of Trade and the Antitrust Laws

- Antitrust laws make it illegal to restrain trade or attempt to monopolize a market.
  - Sherman Antitrust Act of 1890
  - Clayton Act of 1914



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Controversies over Antitrust Policy

- Antitrust policies sometimes may not allow business practices that have potentially positive effects:
  - Resale price maintenance
  - Predatory pricing
  - Tying

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Resale Price Maintenance

Resale price maintenance (or fair trade) occurs when suppliers (like wholesalers) require the retailers that they sell to, to charge customers a specific amount.

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Predatory Pricing

Predatory pricing occurs when a large firm begins to cut the price of its product(s) with the intent of driving its competitor(s) out of the market.

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Tying

Tying refers to when a firm offers two (or more) of its products together at a single price, rather than separately.

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Summary

- Oligopolists maximize their total profits by forming a cartel and acting like a monopolist.
- If oligopolists make decisions about production levels individually, the result is a greater quantity and a lower price than under the monopoly outcome.

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Summary

- The prisoners' dilemma shows that self-interest can prevent people from maintaining cooperation, even when cooperation is in their mutual self-interest.
- The logic of the prisoners' dilemma applies in many situations, including oligopolies.

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Summary

- Policymakers use the antitrust laws to prevent oligopolies from engaging in behavior that reduces competition.

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Graphical Review

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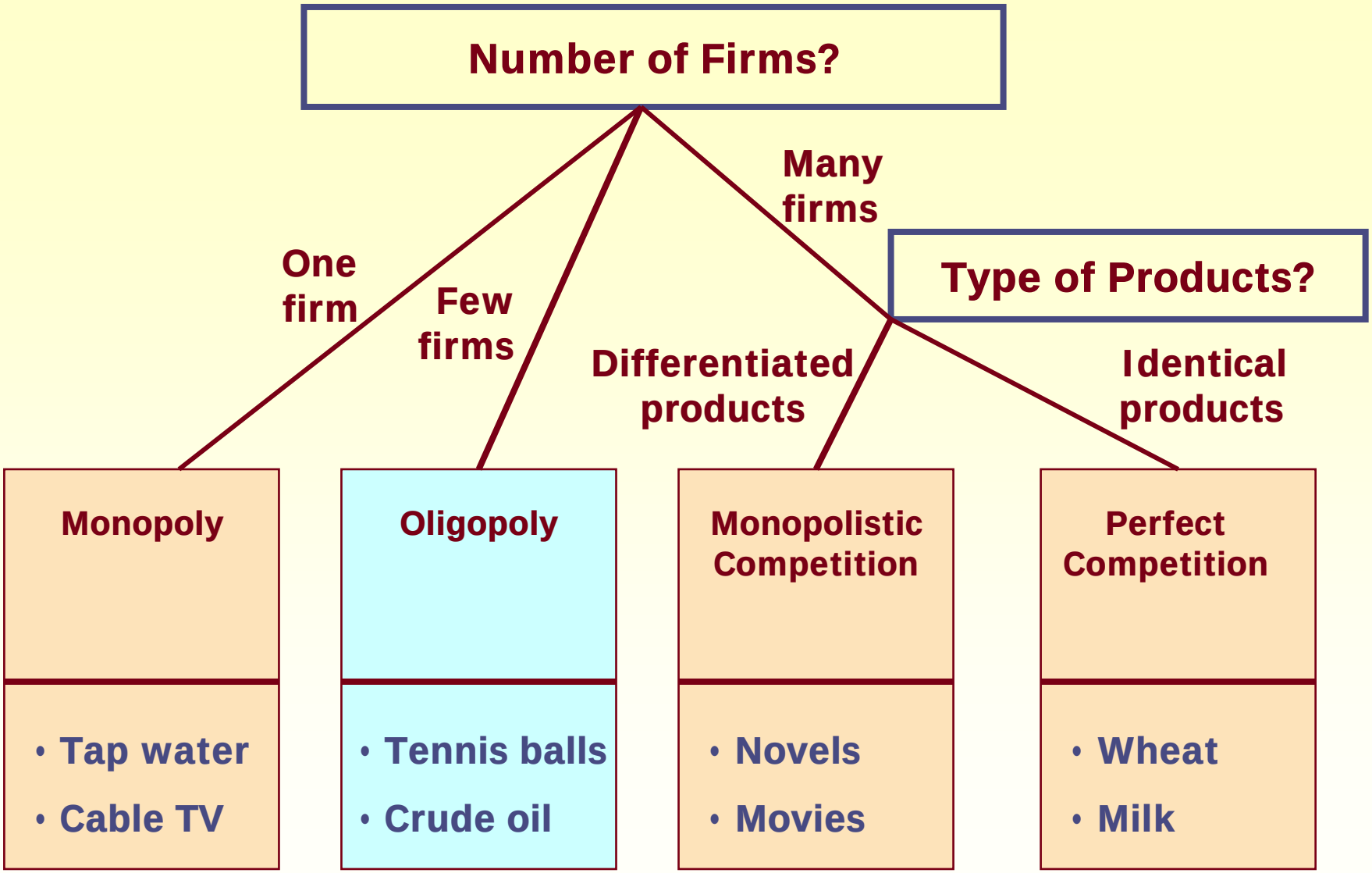

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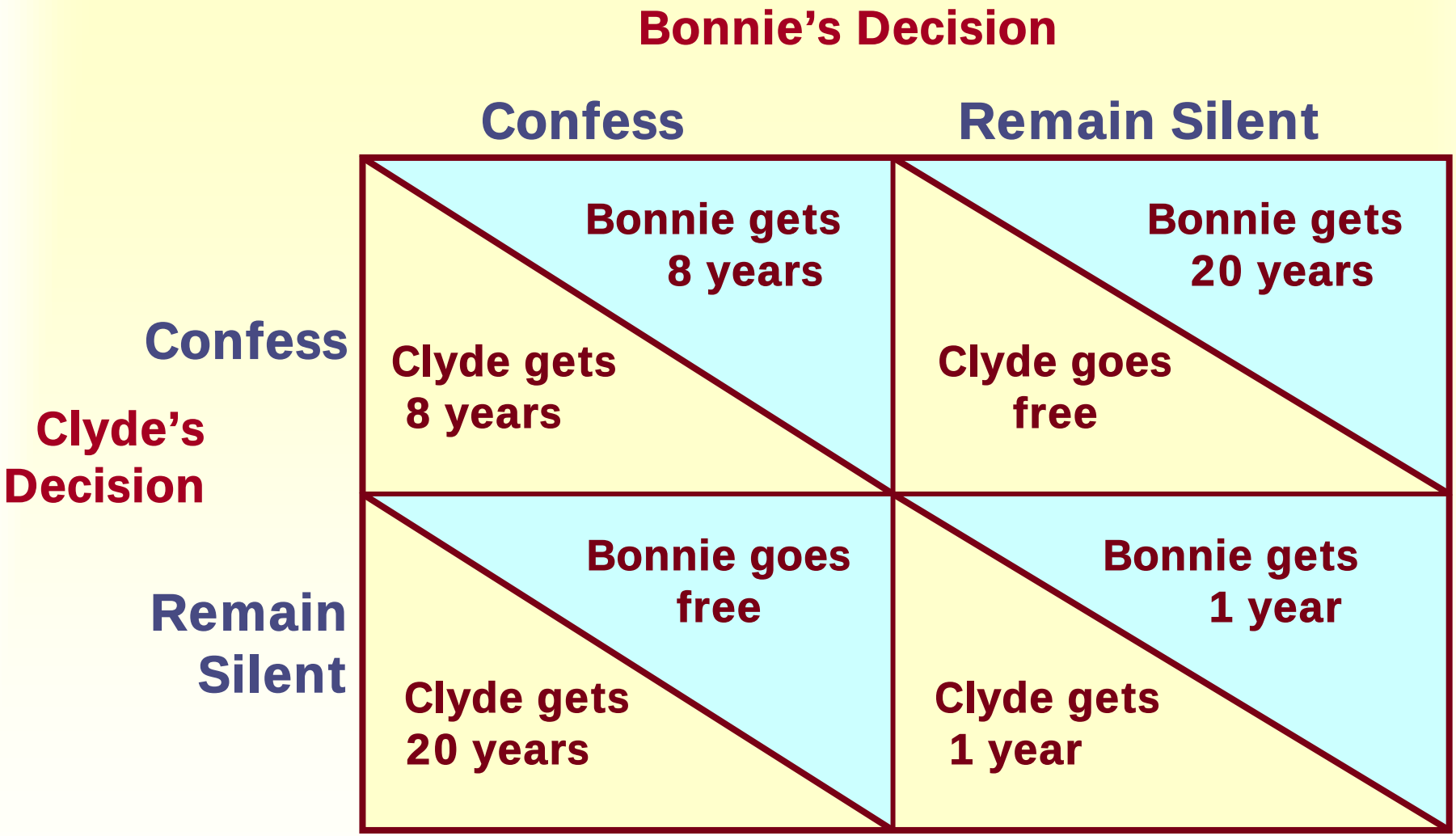
The Prisoners' Dilemma



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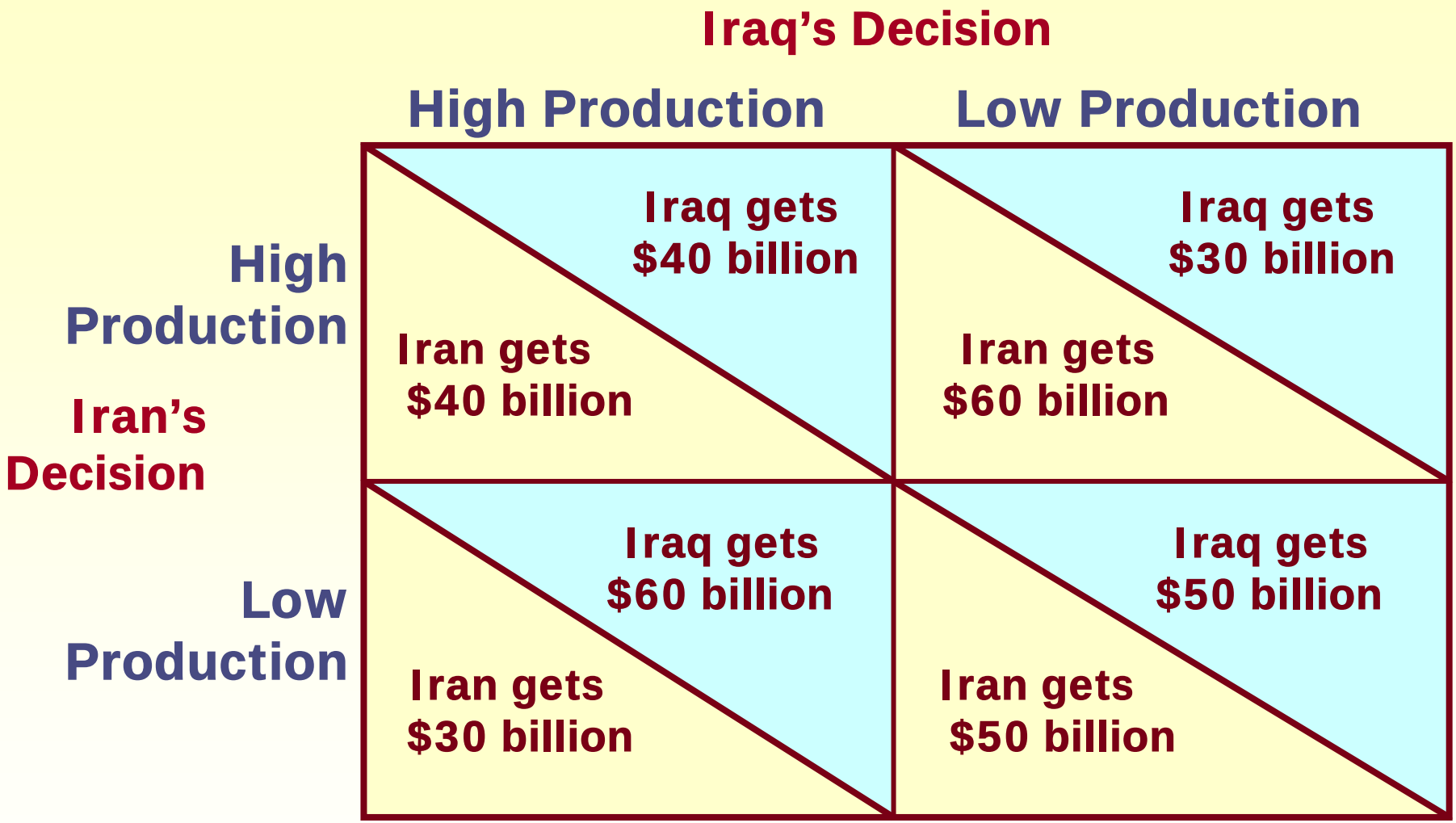
Oligopolies as a Prisoners' Dilemma



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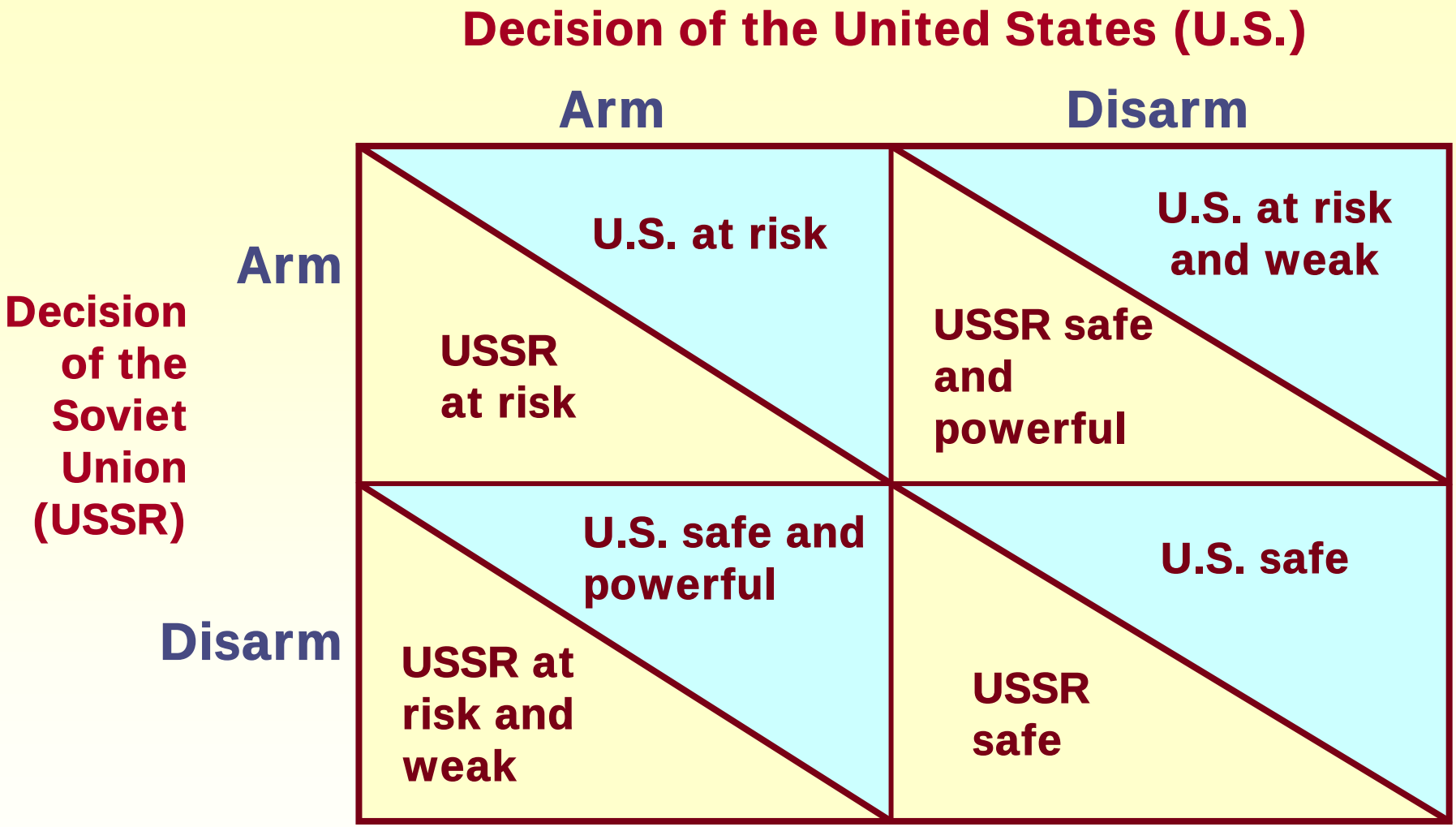
An Arms-Race Game



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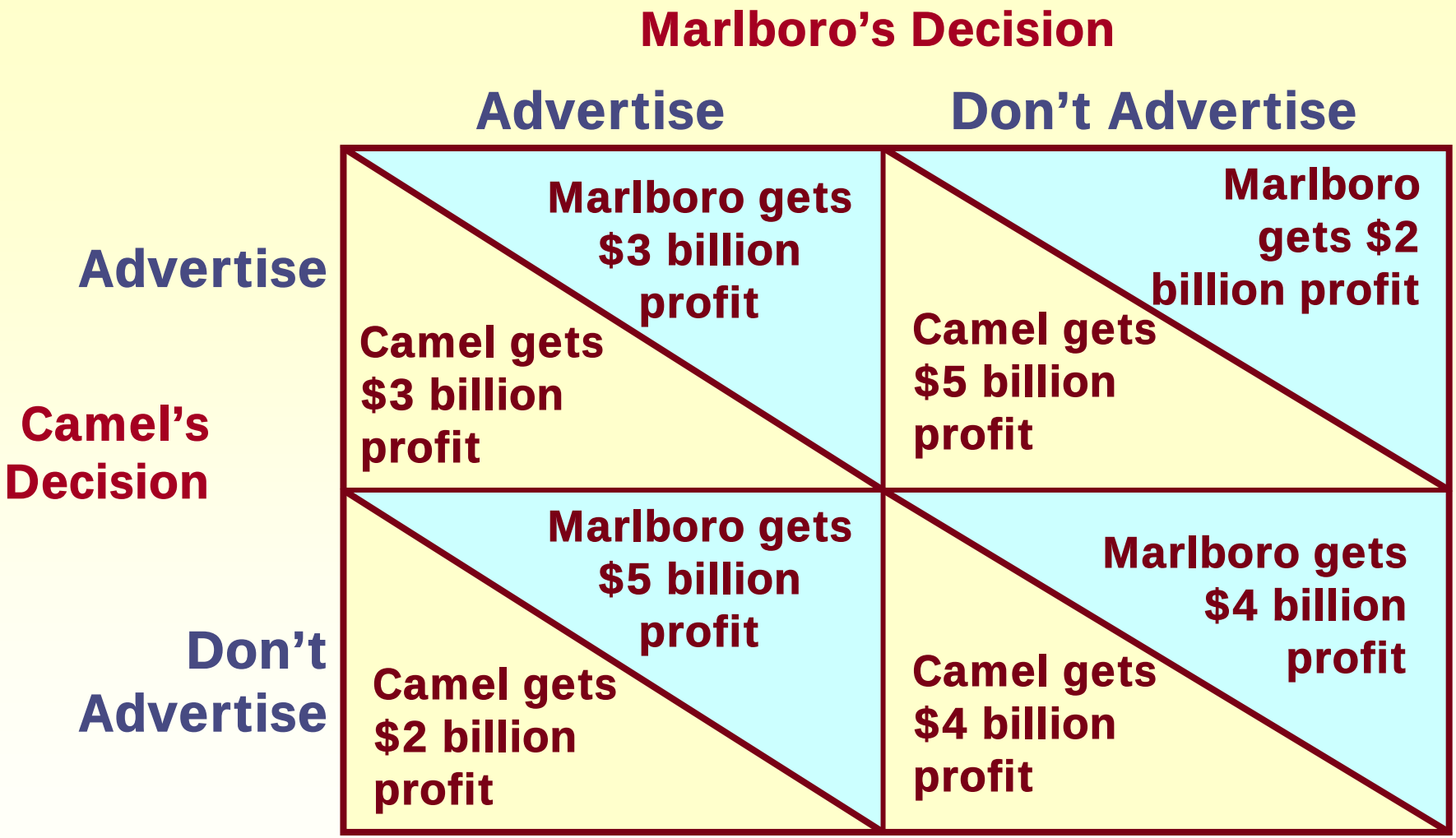

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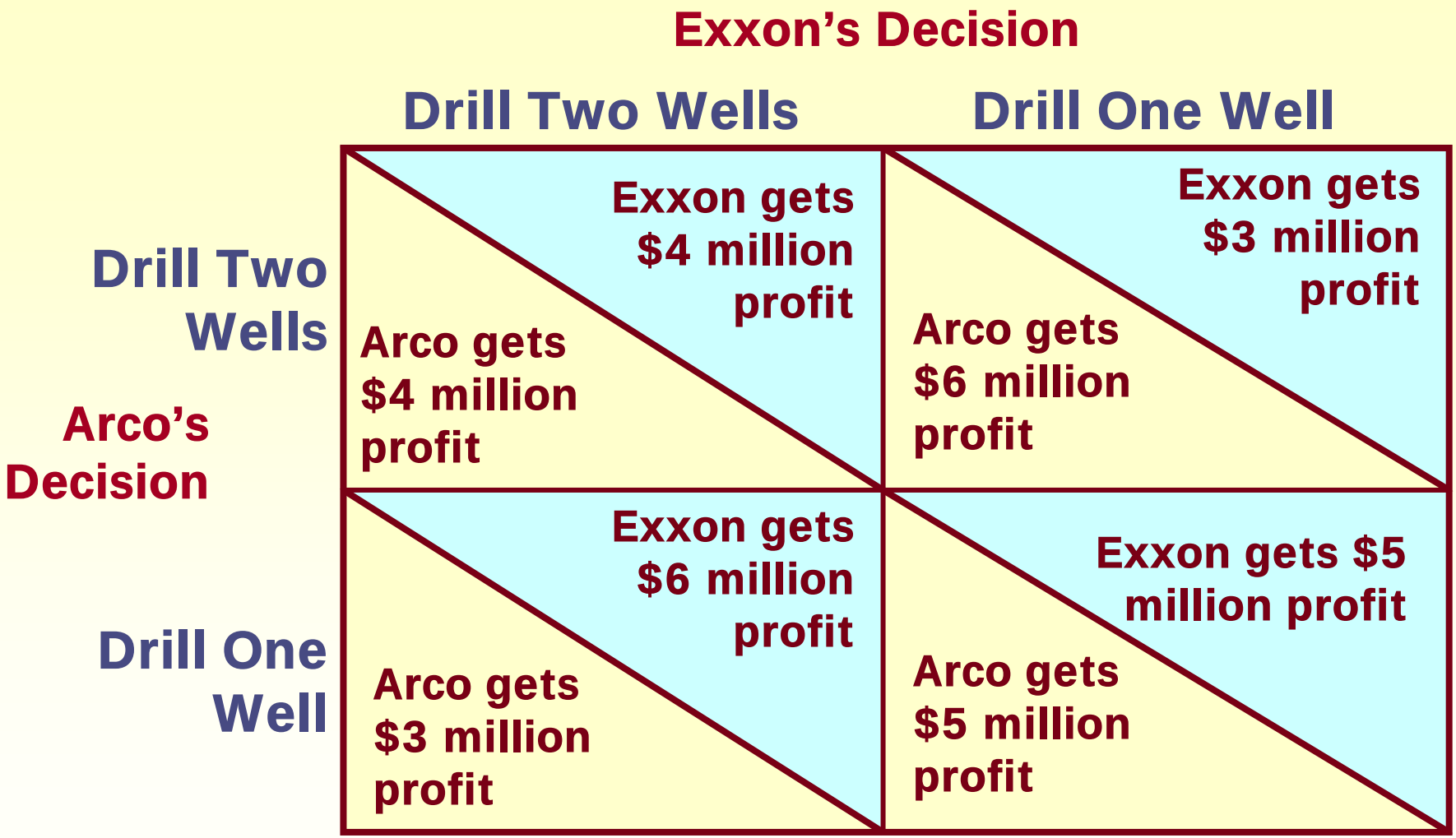

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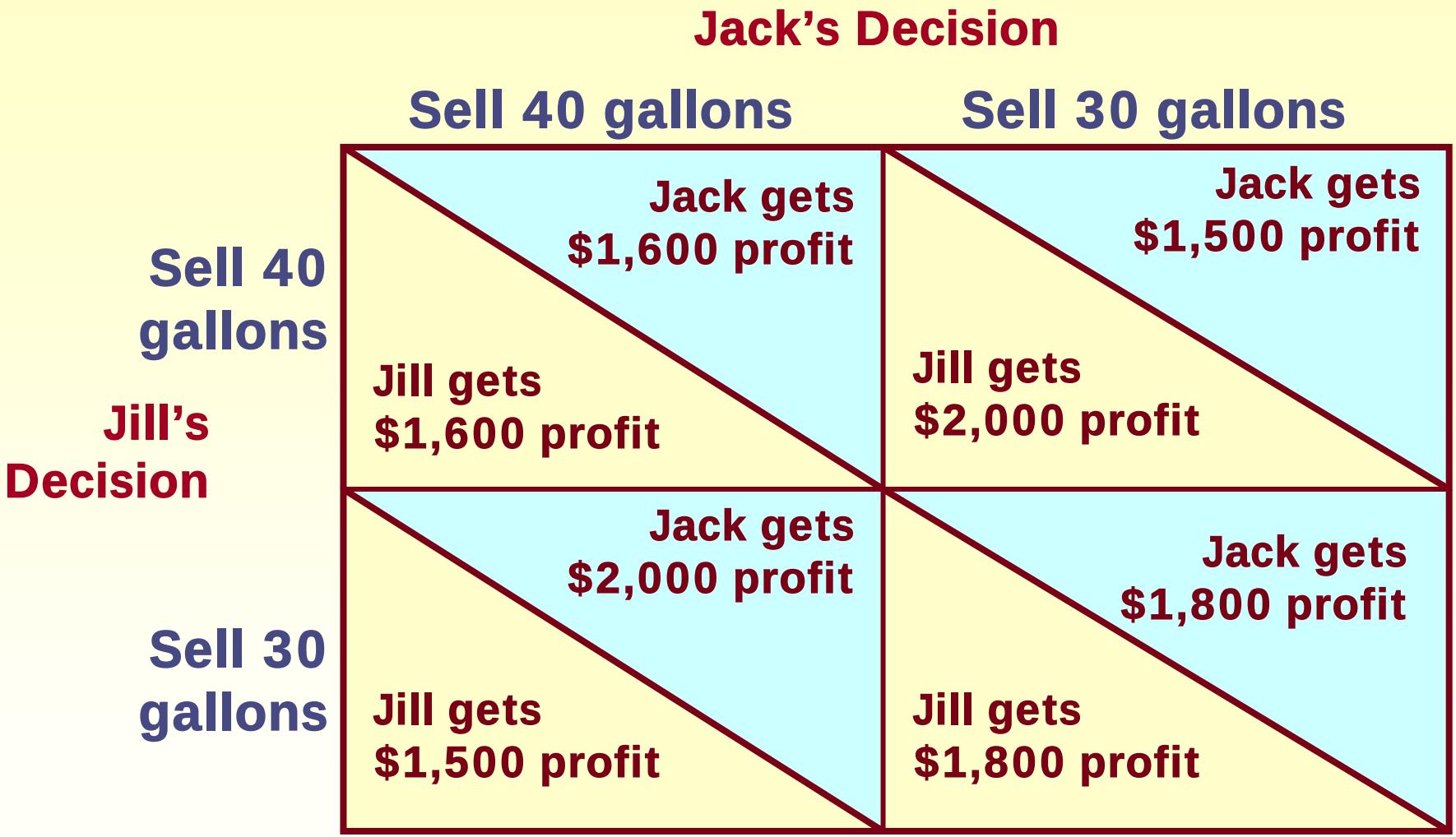
Jack and Jill's Oligopoly Game



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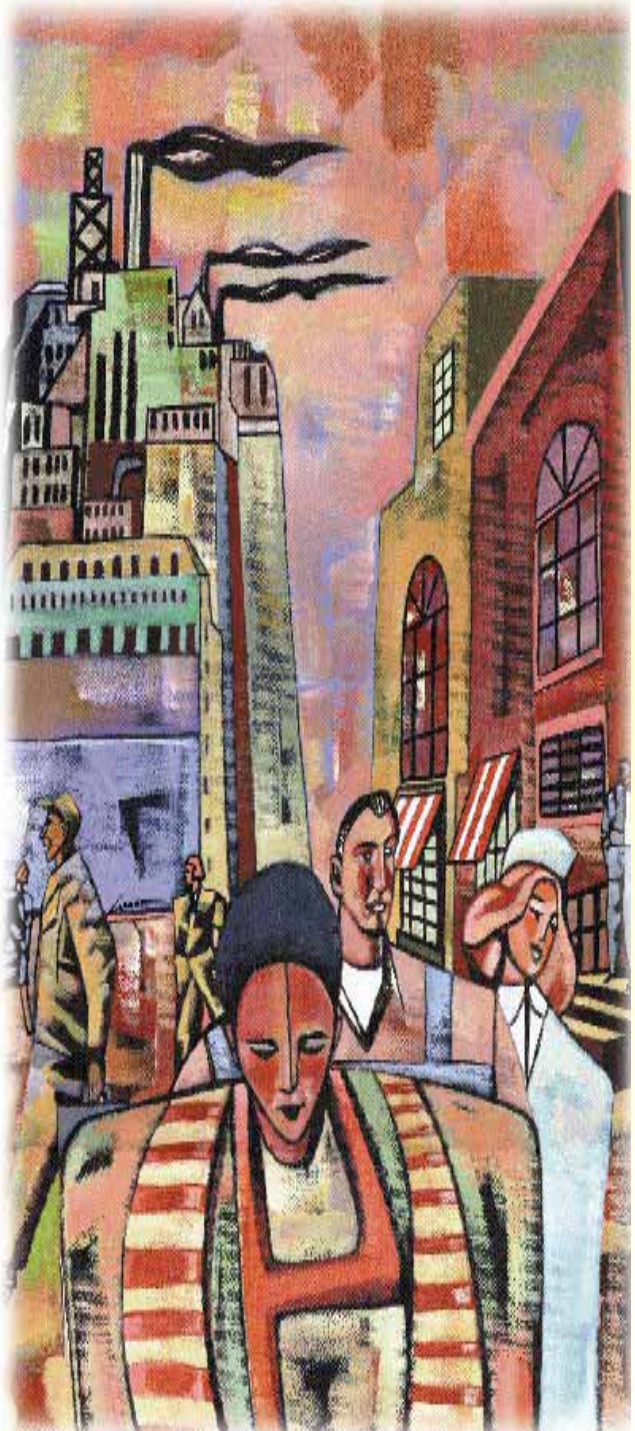

Monopolistic Competition

Chapter 17

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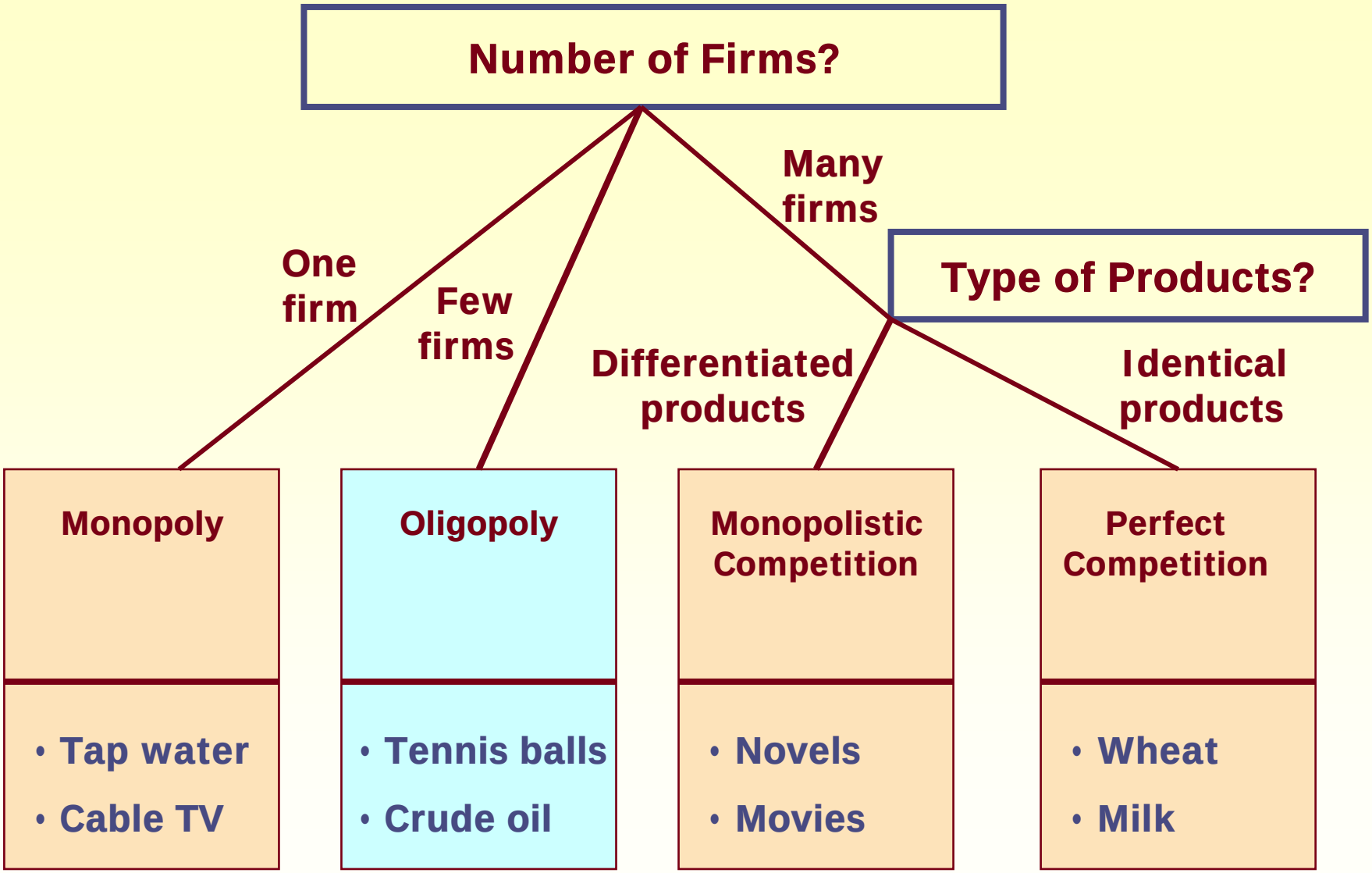
The Four Types of Market Structure



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Types of Imperfectly Competitive Markets

- **Monopolistic Competition**
  - Many firms selling products that are similar but not identical.
- **Oligopoly**
  - Only a few sellers, each offering a similar or identical product to the others.

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Monopolistic Competition

Markets that have some features of competition and some features of monopoly.

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Attributes of Monopolistic Competition

- Many sellers
- Product differentiation
- Free entry and exit

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Many Sellers

There are many firms competing for the same group of customers.

- Product examples include books, CDs, movies, computer games, restaurants, piano lessons, cookies, furniture, etc.

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Product Differentiation

- Each firm produces a product that is at least slightly different from those of other firms.
- Rather than being a price taker, each firm faces a downward-sloping demand curve.

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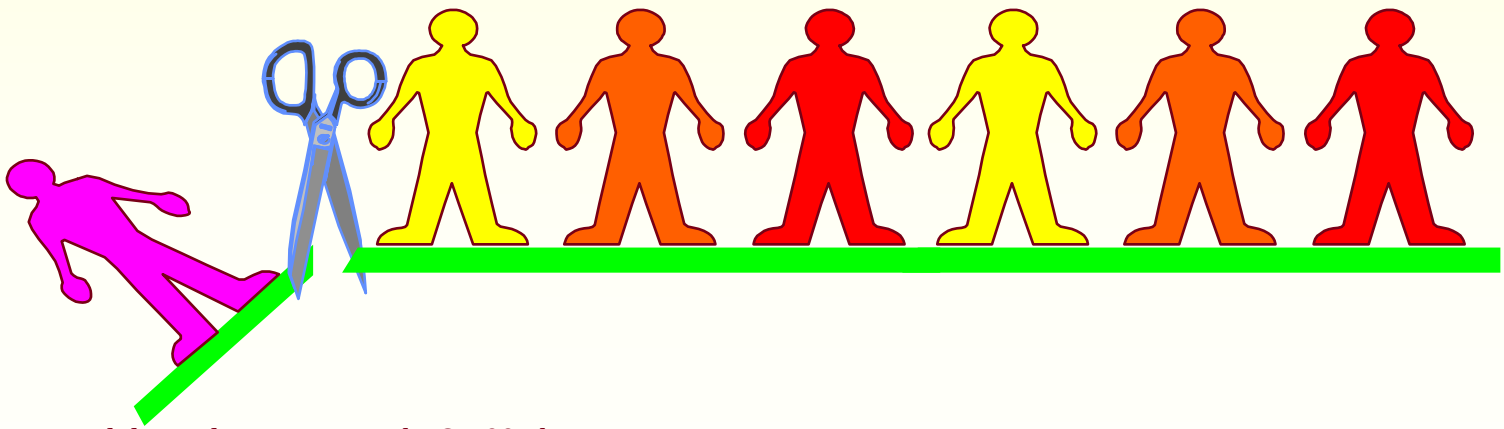
Free Entry or Exit

- Firms can enter or exit the market without restriction.
- The number of firms in the market adjusts until economic profits are zero.



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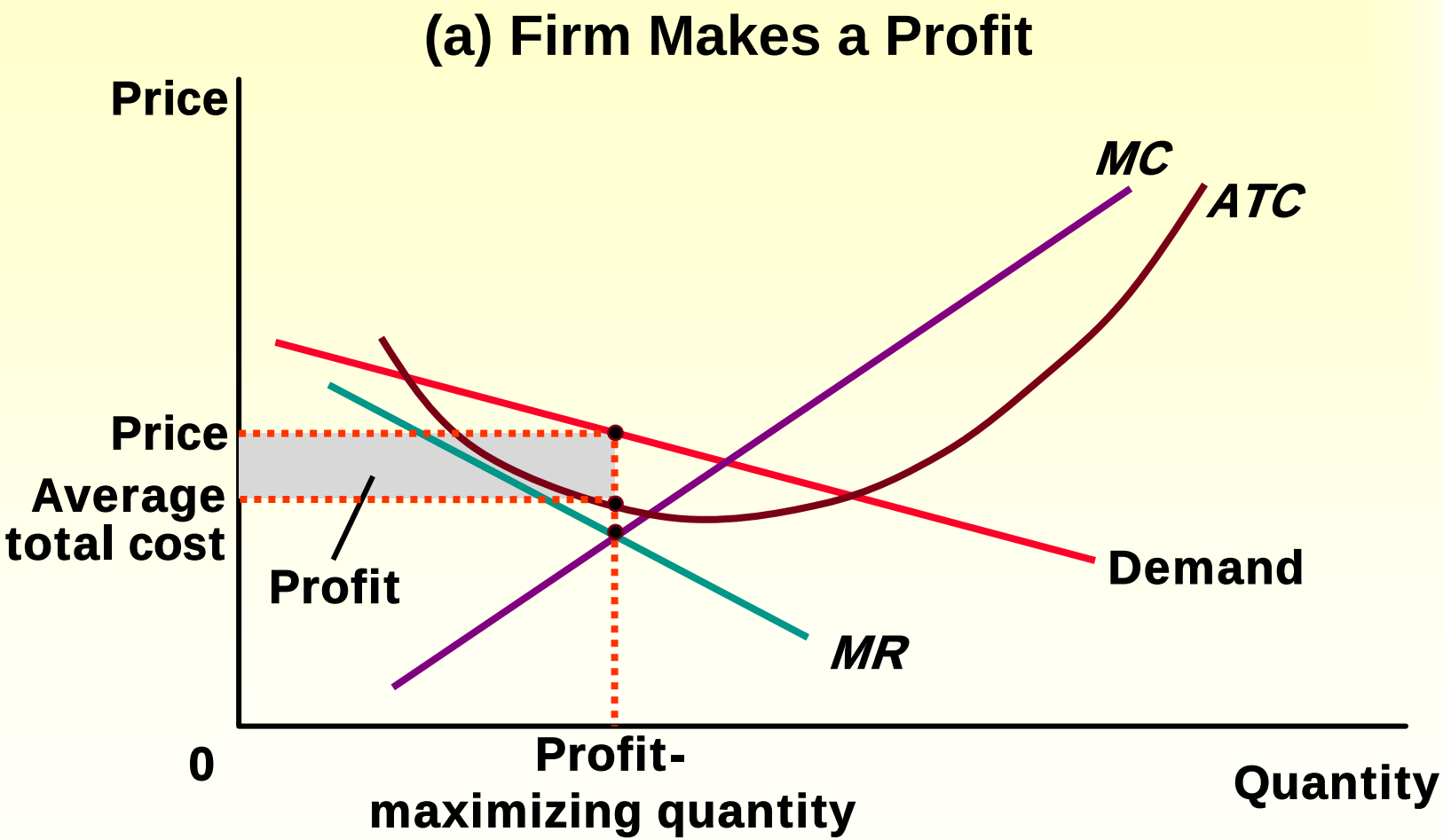
Monopolistic Competitors in the Short Run...



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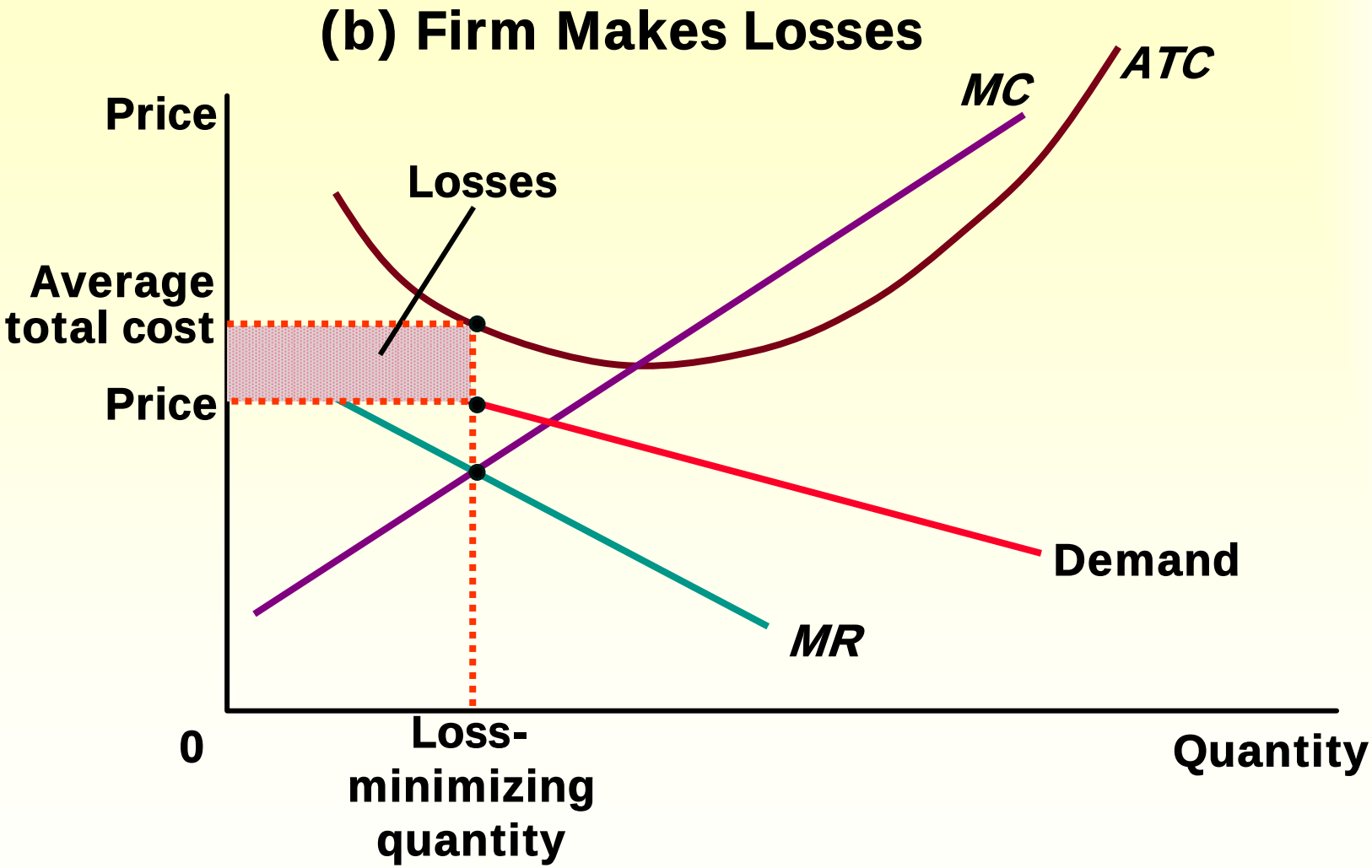
Monopolistic Competitors in the Short Run...



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Monopolistic Competition in the Short Run

Short-run economic profits encourage new firms to enter the market. This:

- **Increases the number of products offered.**
- **Reduces demand faced by firms already in the market.**
- **Incumbent firms' demand curves shift to the left.**
- **Demand for the incumbent firms' products fall, and their profits decline.**

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Monopolistic Competition in the Short Run

Short-run economic losses encourage firms to exit the market. This:

- Decreases the number of products offered.
- Increases demand faced by the remaining firms.
- Shifts the remaining firms' demand curves to the right.
- Increases the remaining firms' profits.

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The Long-Run Equilibrium

Firms will enter and exit until the firms are making exactly zero economic profits.

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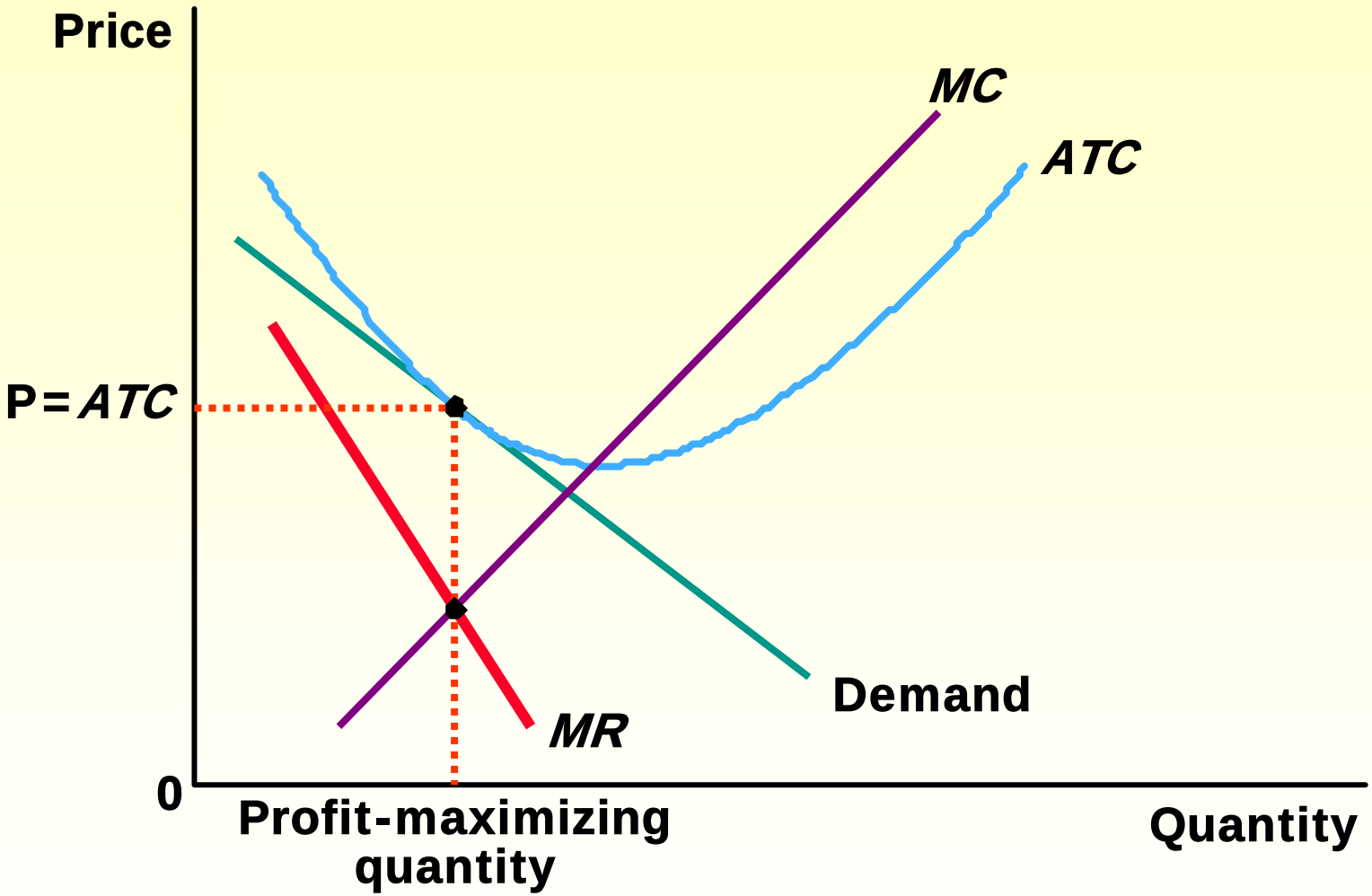
A Monopolistic Competitor in the Long Run...



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Two Characteristics of Long-Run Equilibrium

- As in a monopoly, price exceeds marginal cost.
  - Profit maximization requires marginal revenue to equal marginal cost.
  - The downward-sloping demand curve makes marginal revenue less than price.

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Two Characteristics of Long-Run Equilibrium

- As in a competitive market, price equals average total cost.
  - Free entry and exit drive economic profit to zero.

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Monopolistic versus Perfect Competition

There are two noteworthy differences between monopolistic and perfect competition—excess capacity and markup.

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Excess Capacity

- There is no excess capacity in perfect competition in the long run.
- Free entry results in competitive firms producing at the point where average total cost is minimized, which is the **efficient scale** of the firm.

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Excess Capacity

- There is excess capacity in monopolistic competition in the long run.
- In monopolistic competition, output is less than the efficient scale of perfect competition.

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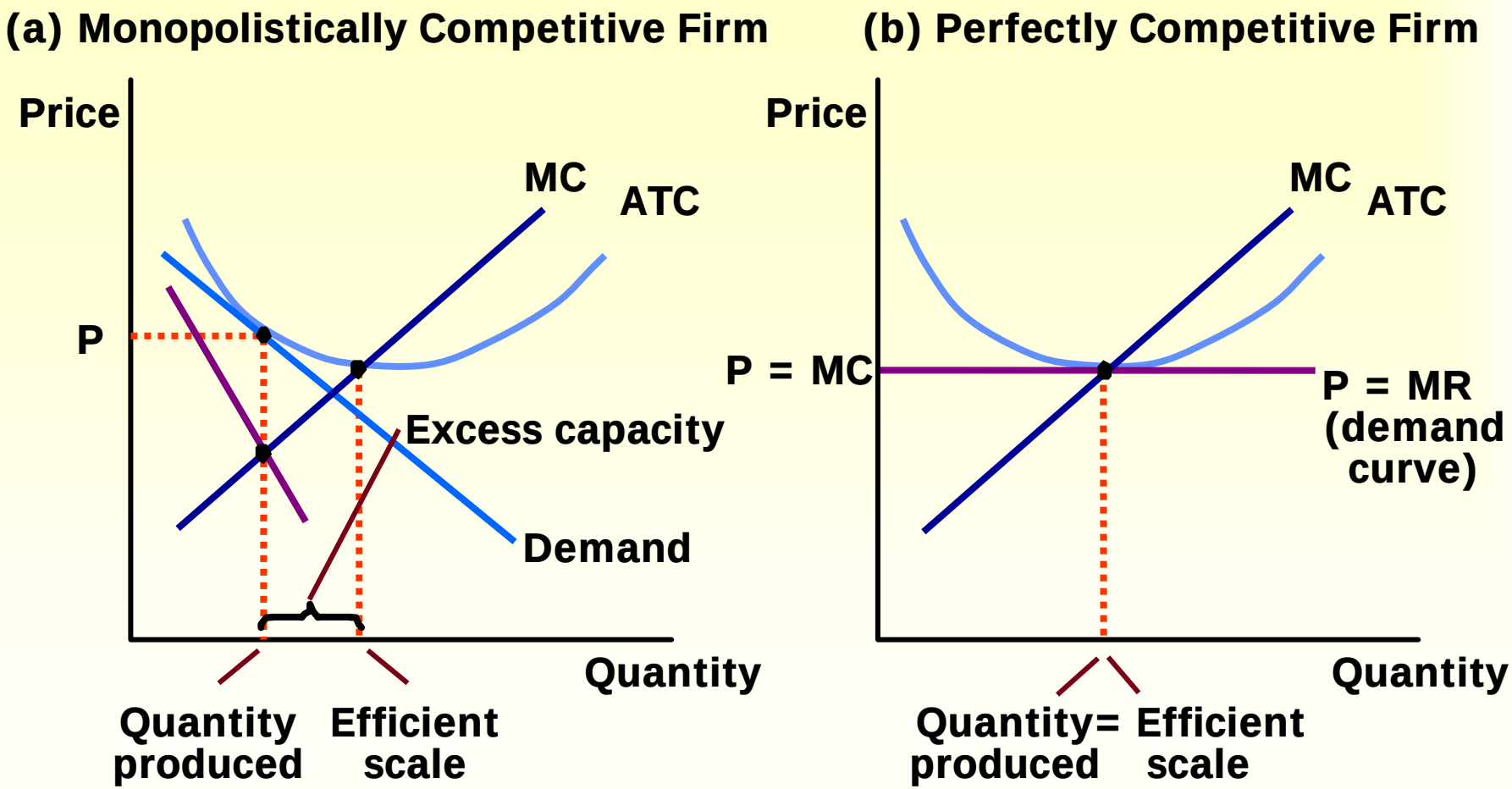
Excess Capacity...



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Markup Over Marginal Cost

- For a competitive firm, price equals marginal cost.
- For a monopolistically competitive firm, price exceeds marginal cost.

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Markup Over Marginal Cost

Because price exceeds marginal cost, an extra unit sold at the posted price means more profit for the monopolistically competitive firm.

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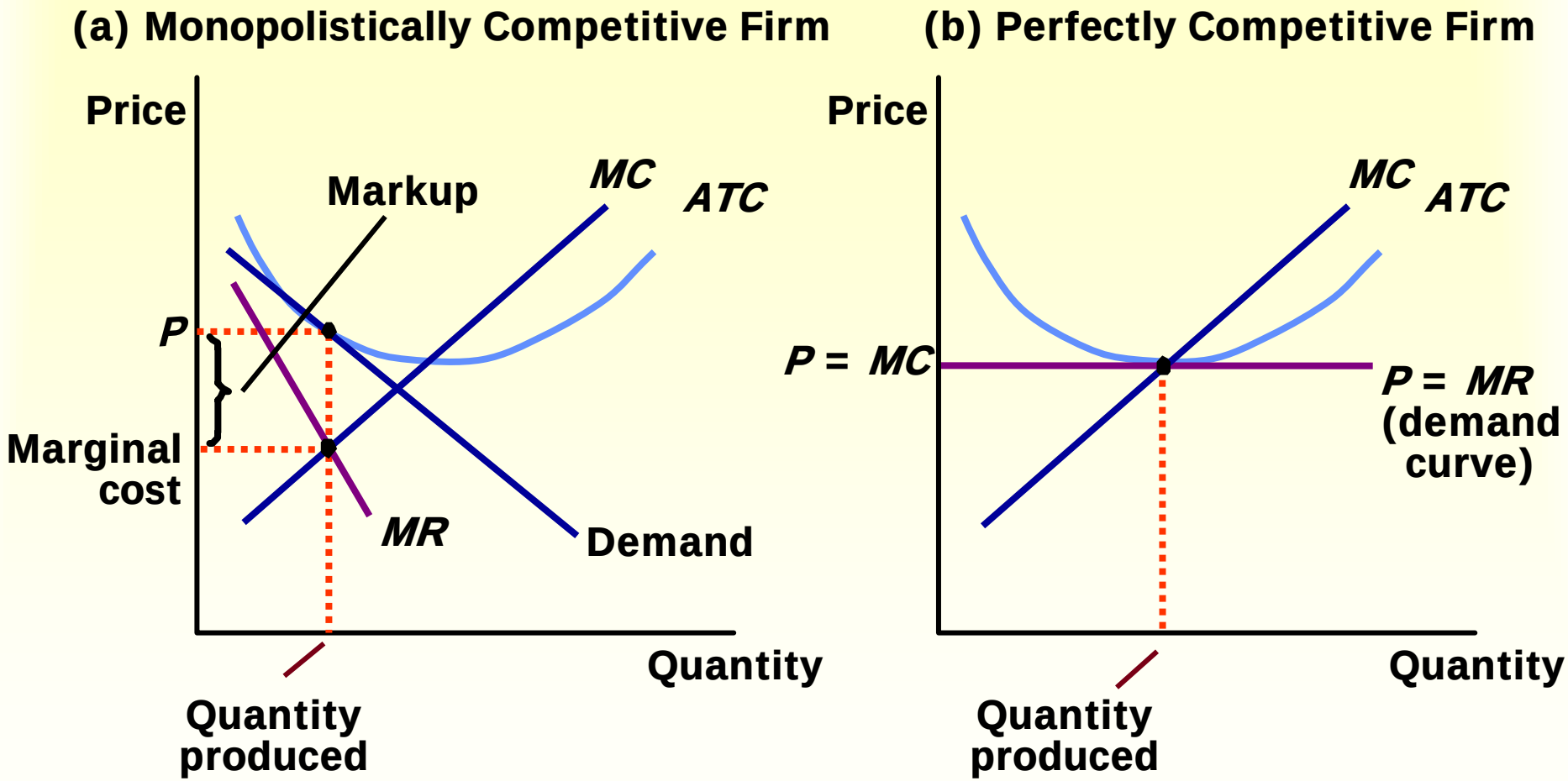
Markup Over Marginal Cost...



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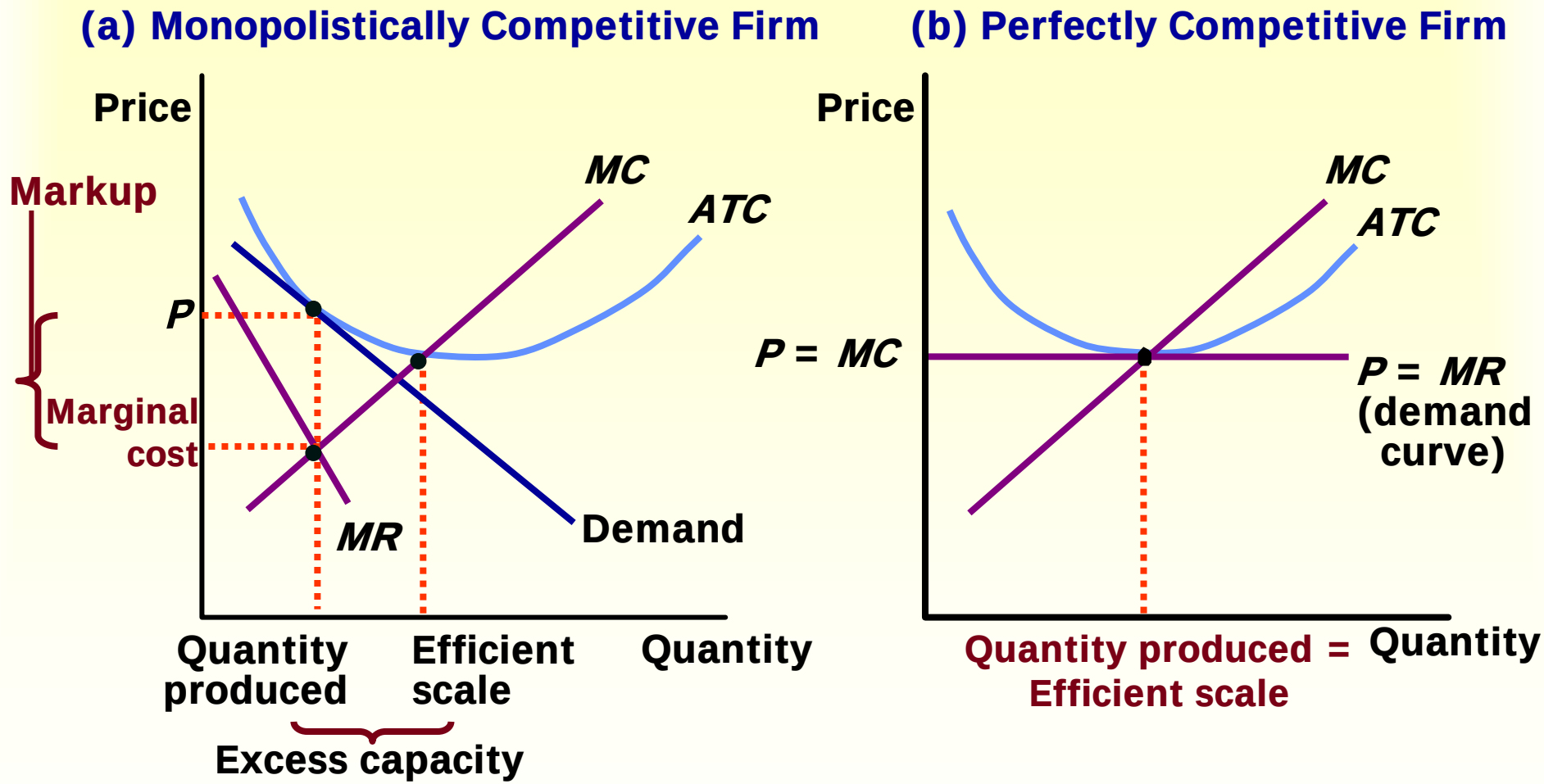
Monopolistic versus Perfect Competition...



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Monopolistic Competition and the Welfare of Society

Monopolistic competition does not have all the desirable properties of perfect competition.

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Monopolistic Competition and the Welfare of Society

- There is the normal deadweight loss of monopoly pricing in monopolistic competition caused by the markup of price over marginal cost.
- However, the administrative burden of regulating the pricing of all firms that produce differentiated products would be overwhelming.

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Monopolistic Competition and the Welfare of Society

Another way in which monopolistic competition may be socially inefficient is that the number of firms in the market may not be the "ideal" one. There may be too much or too little entry.

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Monopolistic Competition and the Welfare of Society

Externalities of entry include:

- **product-variety externalities.**
- **business-stealing externalities.**

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Monopolistic Competition and the Welfare of Society

The product-variety externality: Because consumers get some consumer surplus from the introduction of a new product, entry of a new firm conveys a *positive externality* on consumers.

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Monopolistic Competition and the Welfare of Society

The business-stealing externality: Because other firms lose customers and profits from the entry of a new competitor, entry of a new firm imposes a *negative externality* on existing firms.

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Advertising

When firms sell differentiated products and charge prices above marginal cost, each firm has an incentive to advertise in order to attract more buyers to its particular product.

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Advertising

- Firms that sell highly differentiated consumer goods typically spend between 10 and 20 percent of revenue on advertising.
- Overall, about 2 percent of total revenue, or over $100 billion a year, is spent on advertising.

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Advertising

- Critics of advertising argue that firms advertise in order to manipulate people's tastes.
- They also argue that it impedes competition by implying that products are more different than they truly are.

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Advertising

- Defenders argue that advertising provides information to consumers
- They also argue that advertising increases competition by offering a greater variety of products and prices.
- The willingness of a firm to spend advertising dollars can be a signal to consumers about the quality of the product being offered.

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Brand Names

- Critics argue that brand names cause consumers to perceive differences that do not really exist.

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Brand Names

- Economists have argued that brand names may be a useful way for consumers to ensure that the goods they are buying are of high quality.
  - providing **information** about quality.
  - giving firms **incentive** to maintain high quality.

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Summary

- A monopolistically competitive market is characterized by three attributes: many firms, differentiated products, and free entry.
- The equilibrium in a monopolistically competitive market differs from perfect competition in that each firm has excess capacity and each firm charges a price above marginal cost.

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Summary

- Monopolistic competition does not have all of the desirable properties of perfect competition.
- There is a standard deadweight loss of monopoly caused by the markup of price over marginal cost.
- The number of firms can be too large or too small.

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Summary

- The product differentiation inherent in monopolistic competition leads to the use of advertising and brand names.
- Critics of advertising and brand names argue that firms use them to take advantage of consumer irrationality and to reduce competition.

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Summary

- Defenders argue that firms use advertising and brand names to inform consumers and to compete more vigorously on price and product quality.

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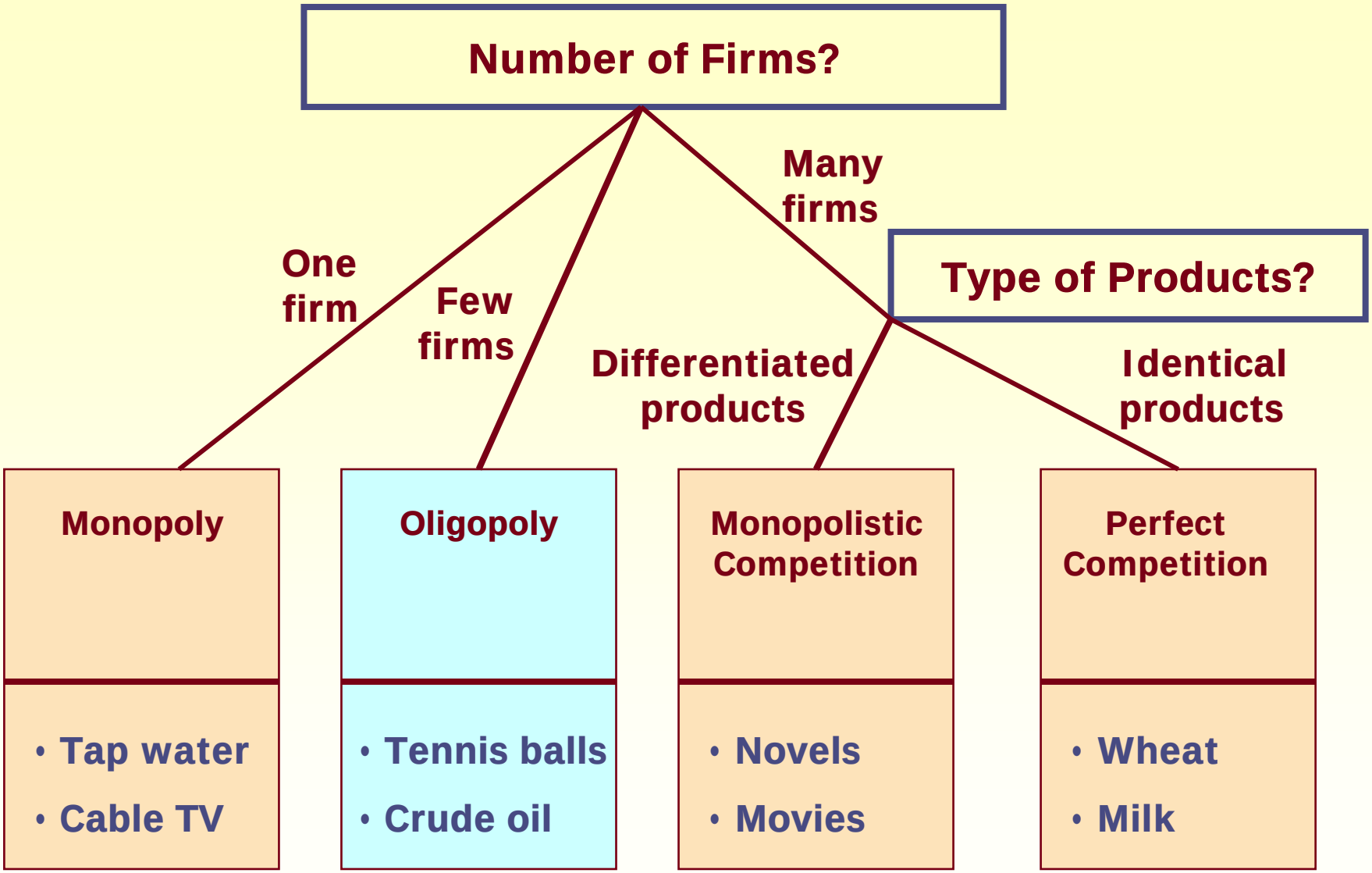

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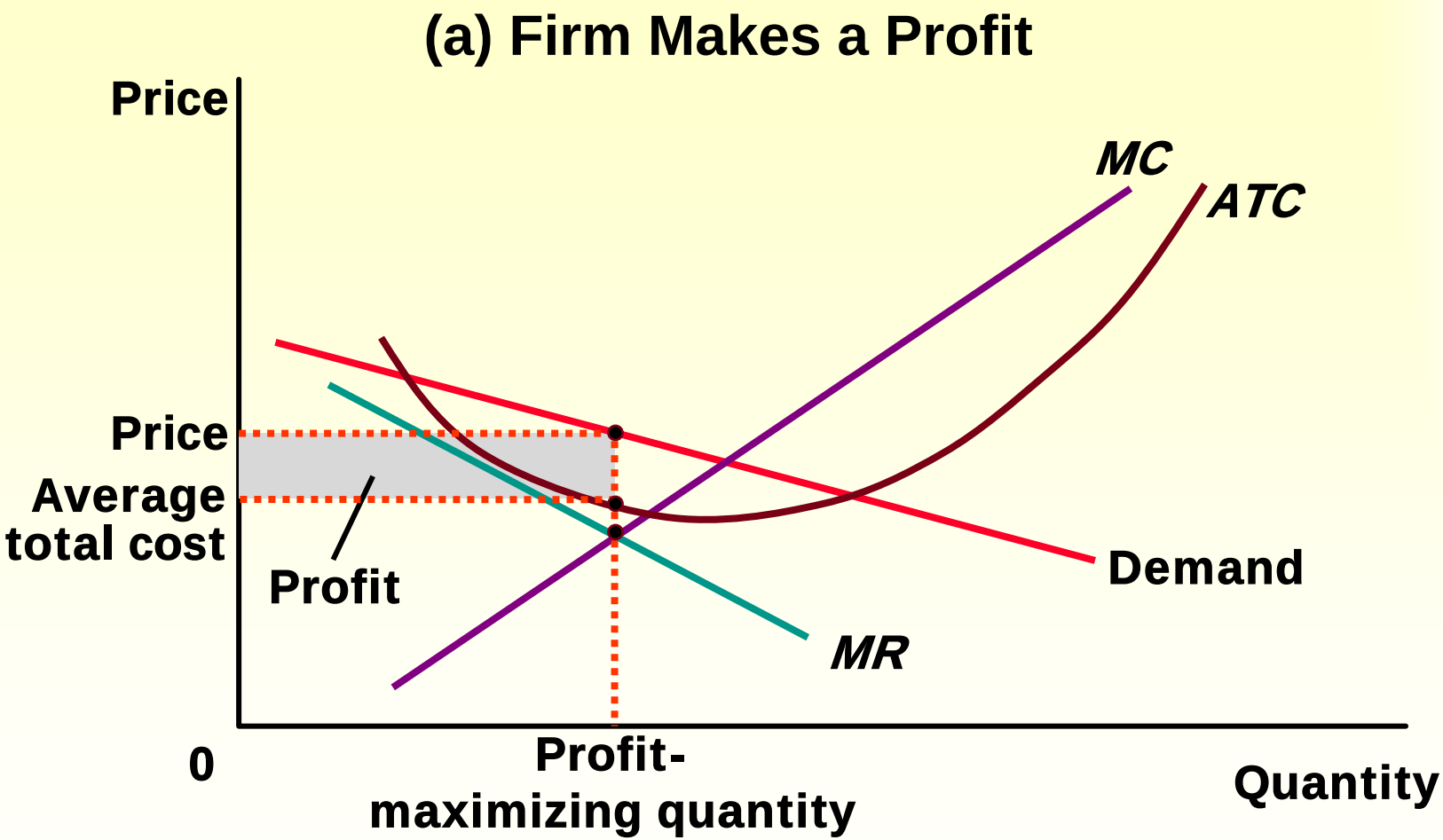
Monopolistic Competitors in the Short Run...



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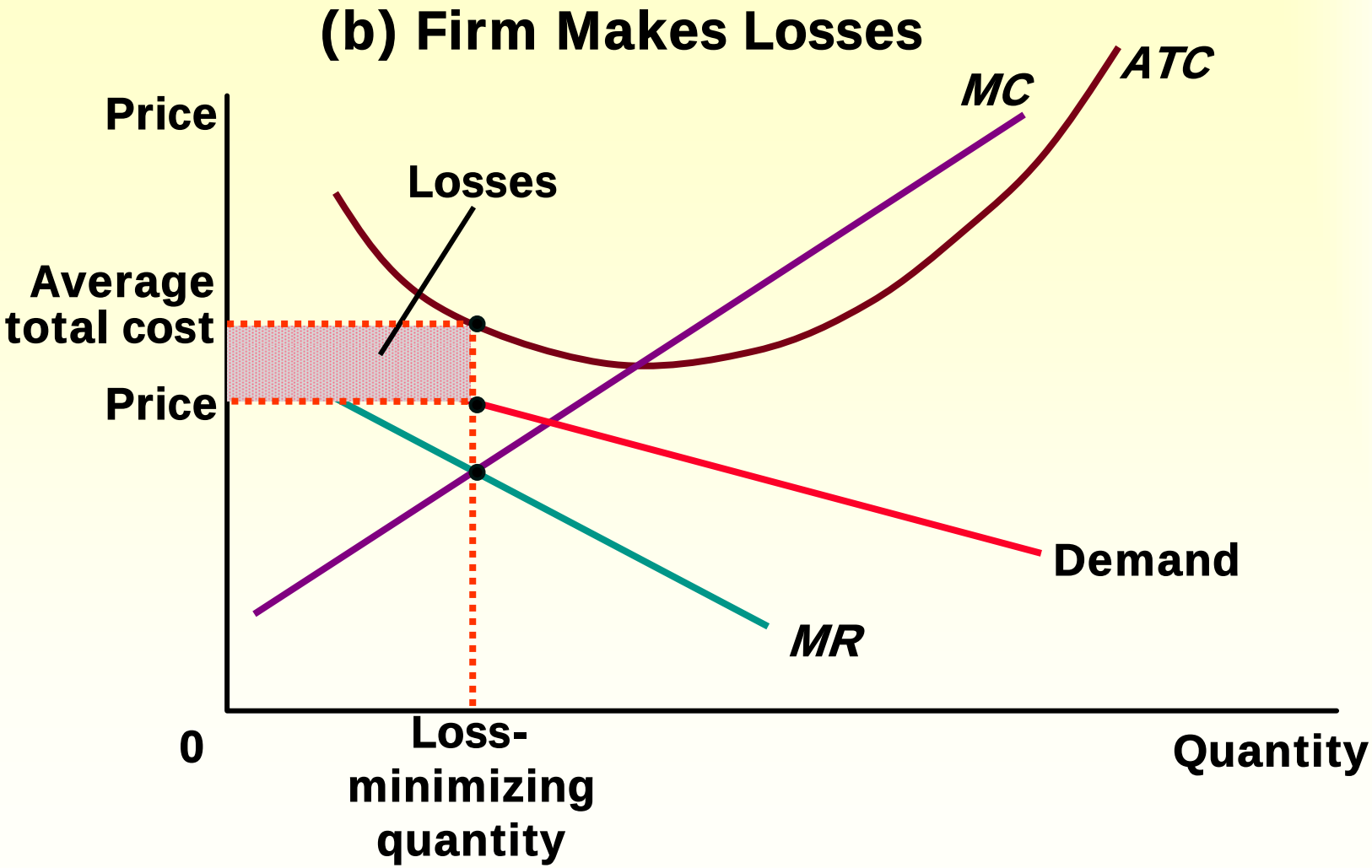
Monopolistic Competitors in the Short Run...



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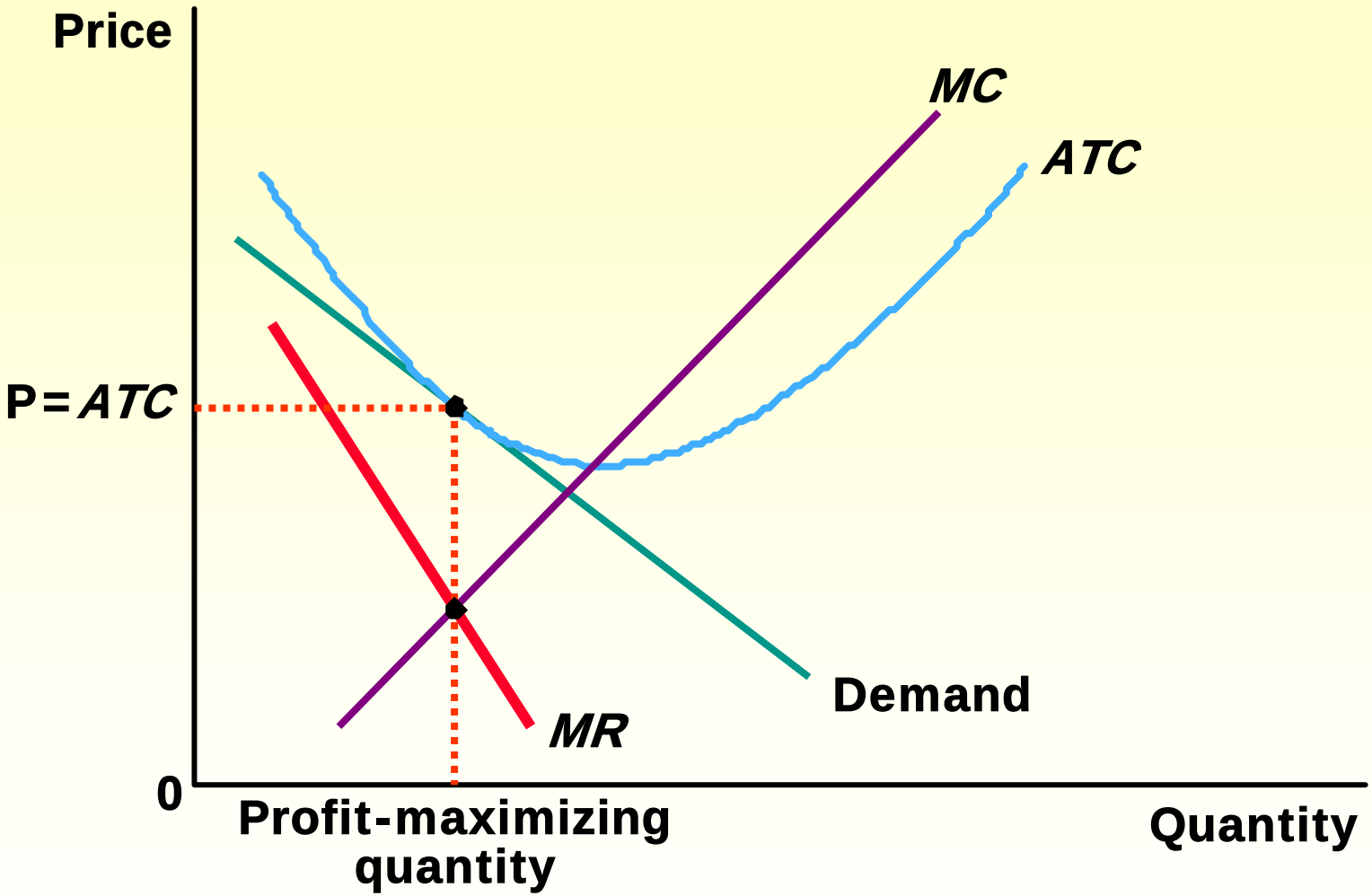
A Monopolistic Competitor in the Long Run...



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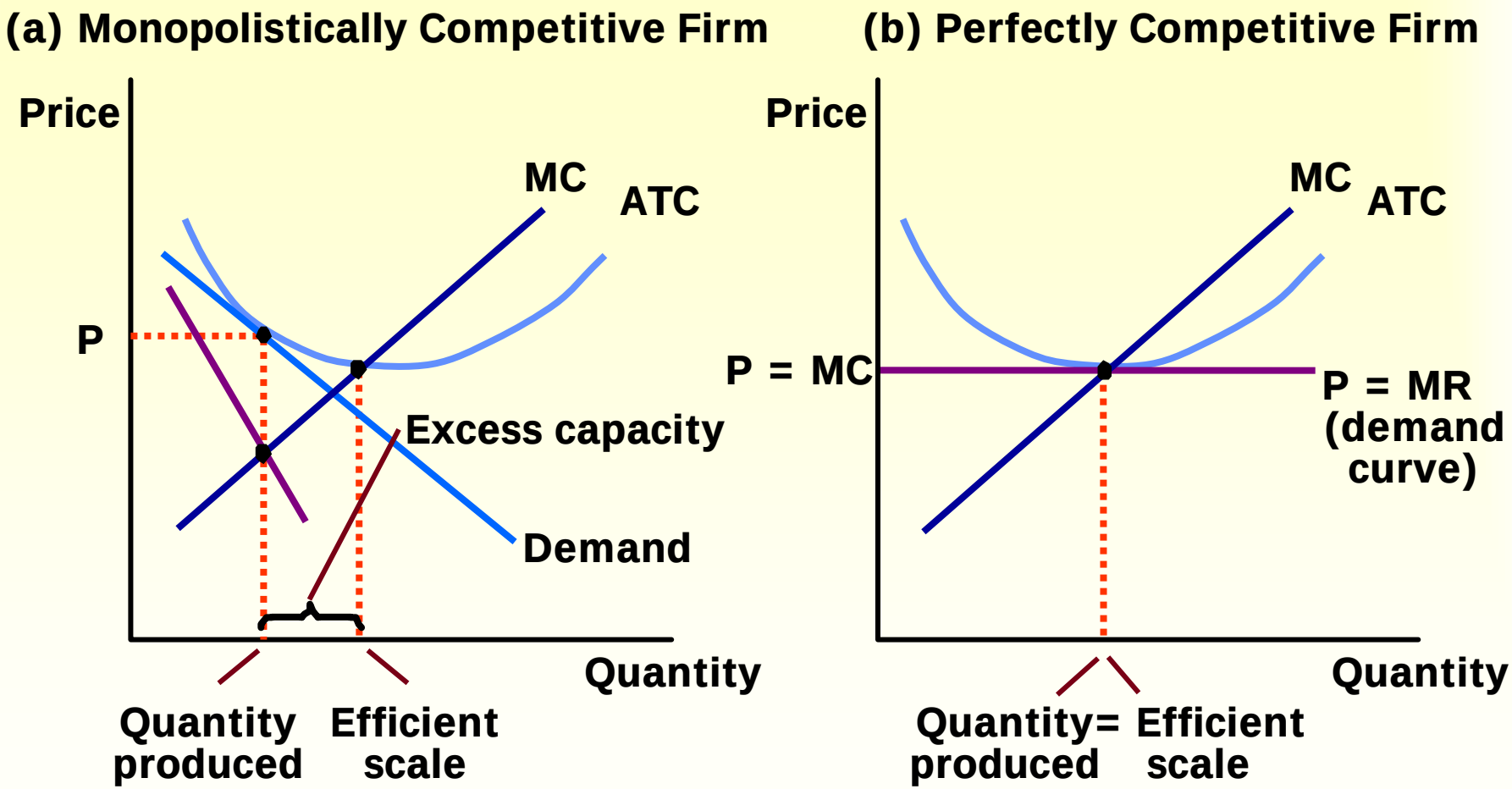
Excess Capacity...



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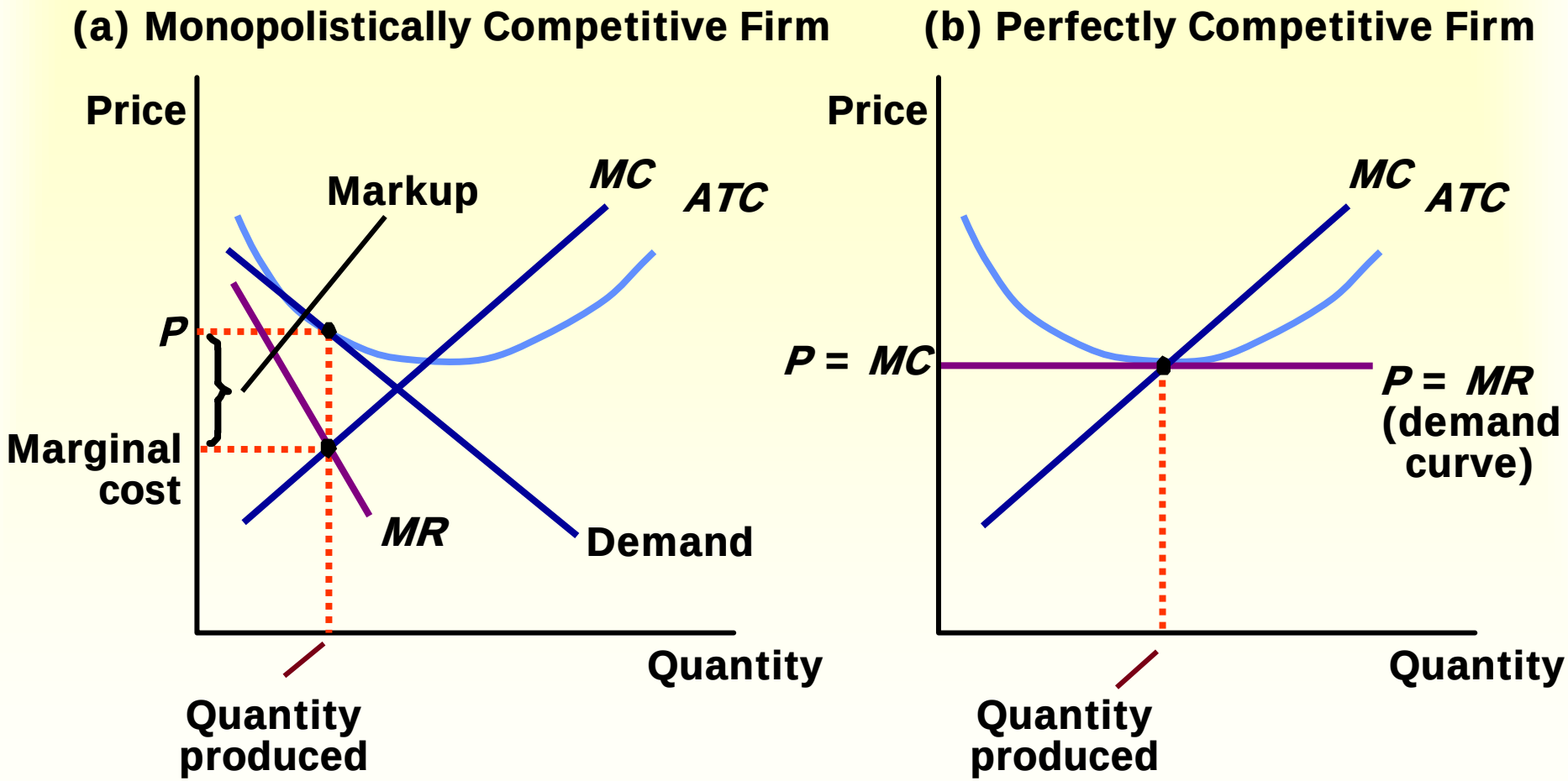
Markup Over Marginal Cost...



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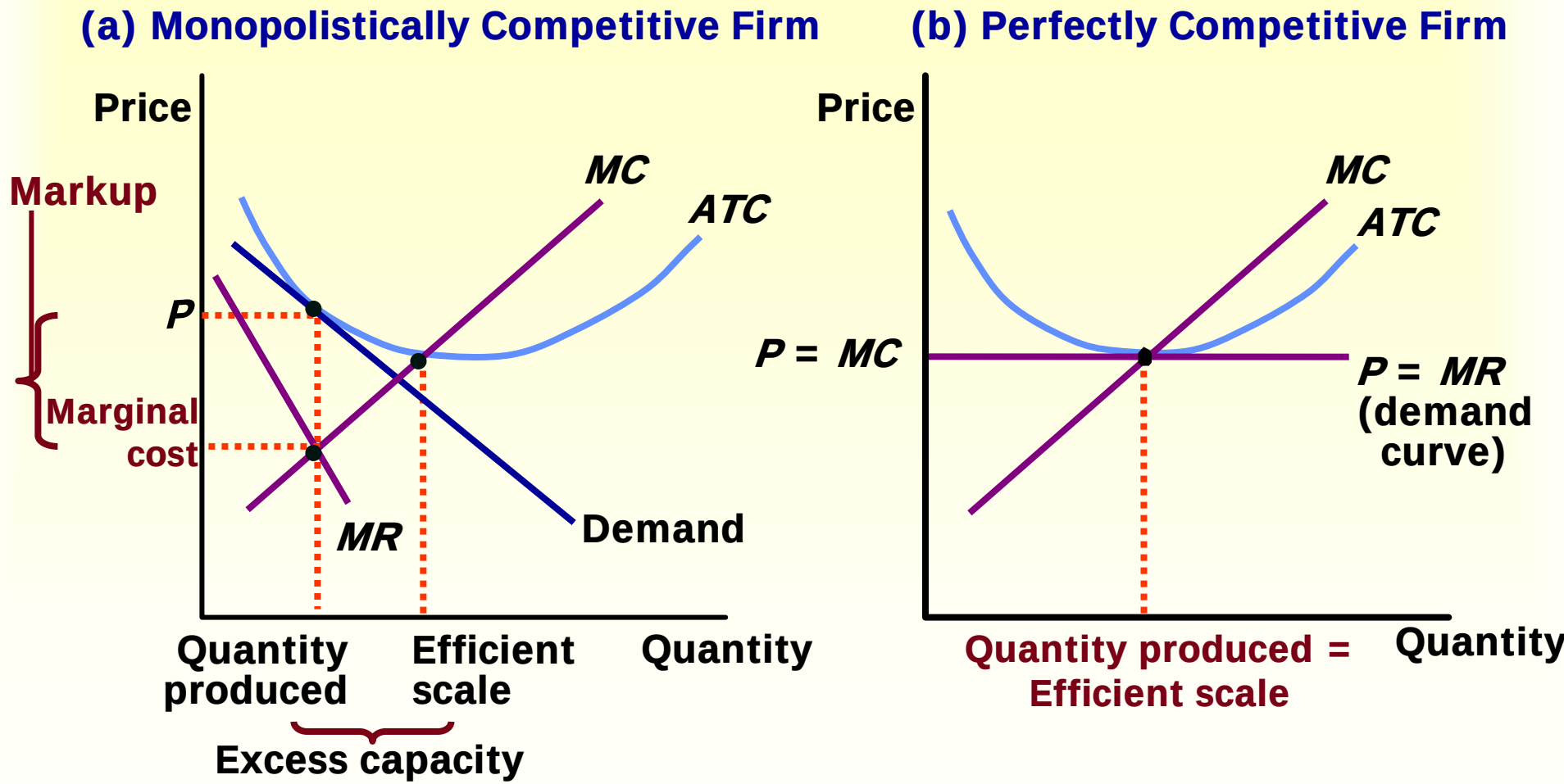
Monopolistic versus Perfect Competition...



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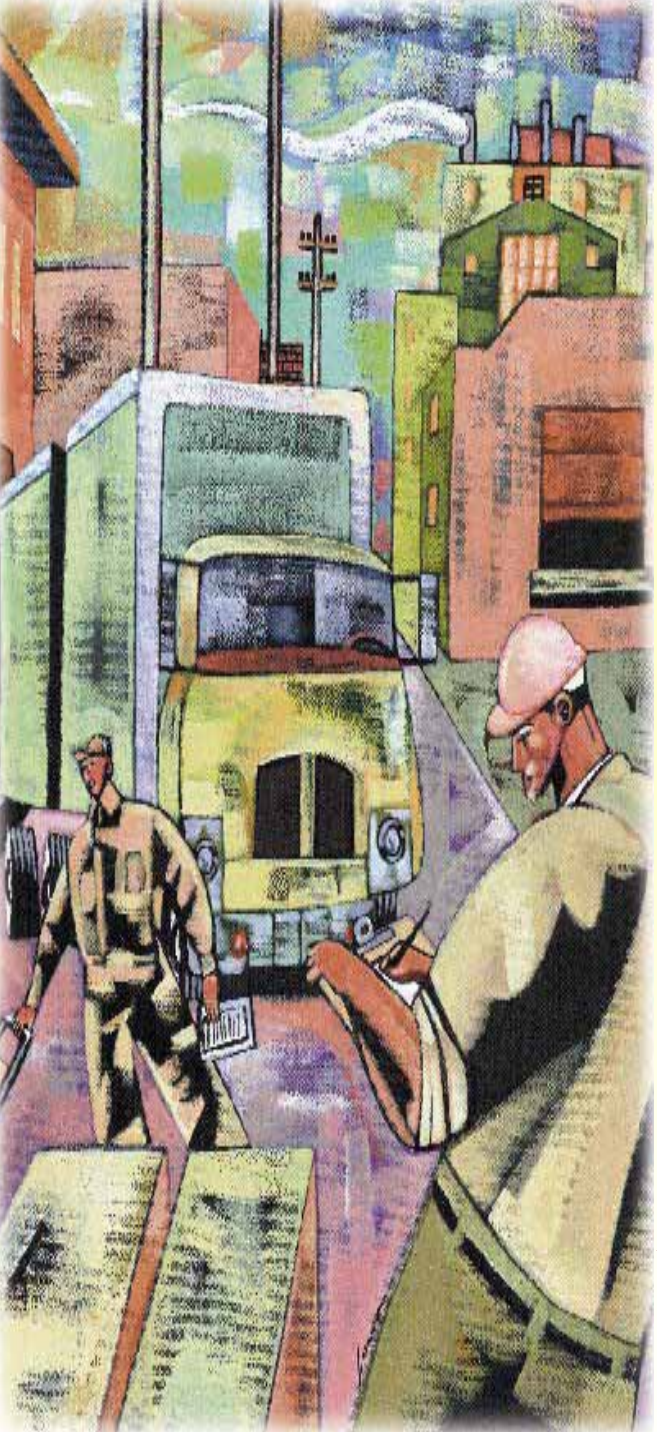

The Economics of Labor Markets

Chapter 18

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Factors of Production

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The Market for the Factors of Production

The demand for a factor of production is a derived demand.

- **A firm's demand for a factor of production is *derived* from its decision to supply a good in another market.**

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The Demand for Labor

Labor markets, like other markets in the economy, are governed by the forces of supply and demand.

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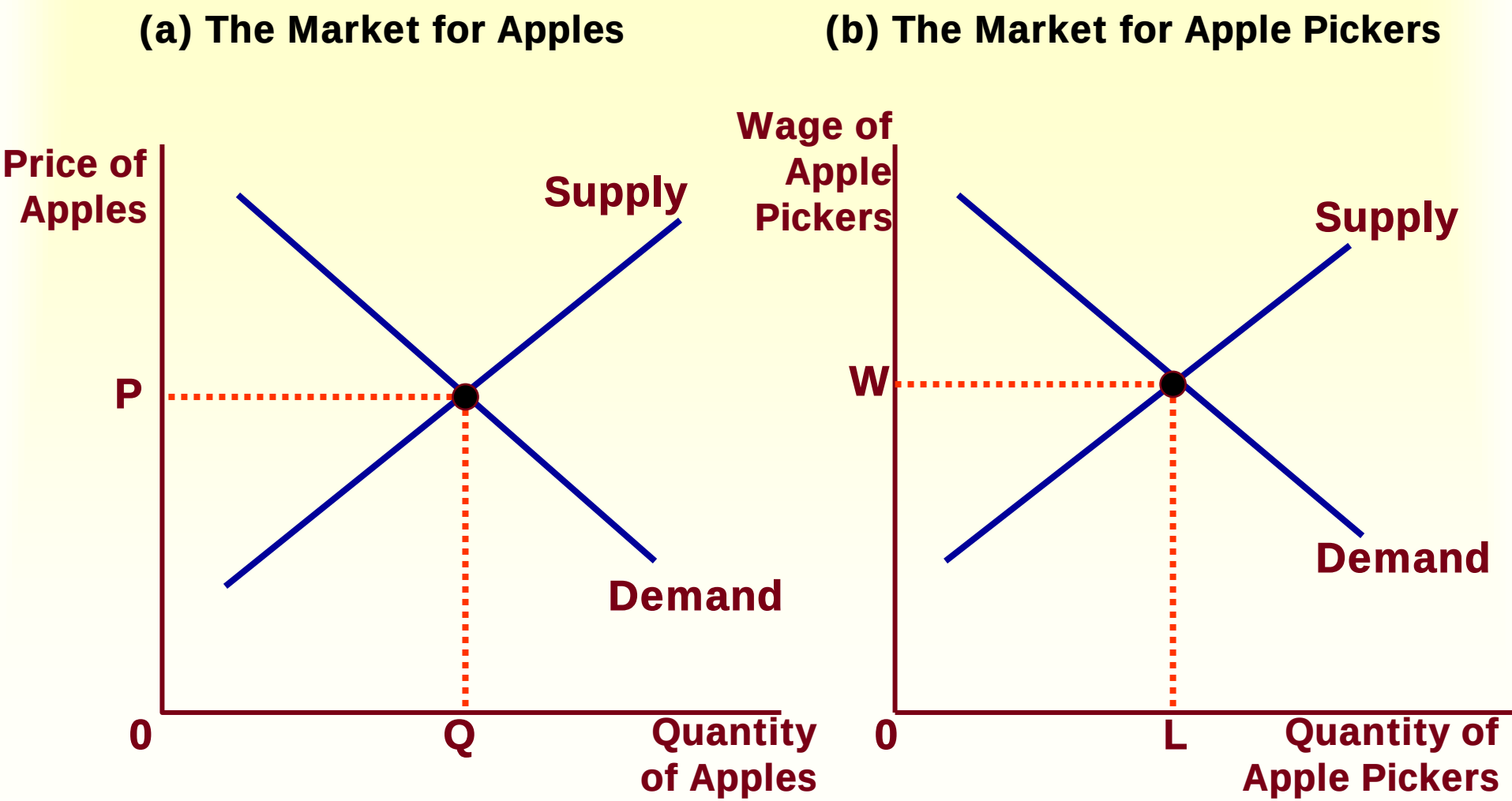
The Versatility of Supply and Demand...



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The Demand For Labor

Most labor services, rather than being final goods ready to be enjoyed by consumers, are inputs into the production of other goods.

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The Production Function and The Marginal Product of Labor

The production function illustrates the relationship between the quantity of inputs used and the quantity of output of a good.

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How the Competitive Firm Decides How Much Labor to Hire

Labor L	Output Q	Marginal Product of Labor MPL $MPL = \Delta Q / \Delta L$	Value of the Marginal Product of Labor VMPL=PxMPL	Wage W	Marginal Profit $\Delta Profit = VMPL - W$
0	0				
1	100	100	$1,000	$500	$500
2	180	80	$800	$500	$300
3	240	60	$600	$500	$100
4	280	40	$400	$500	-$100
5	300	20	$200	$500	-$300

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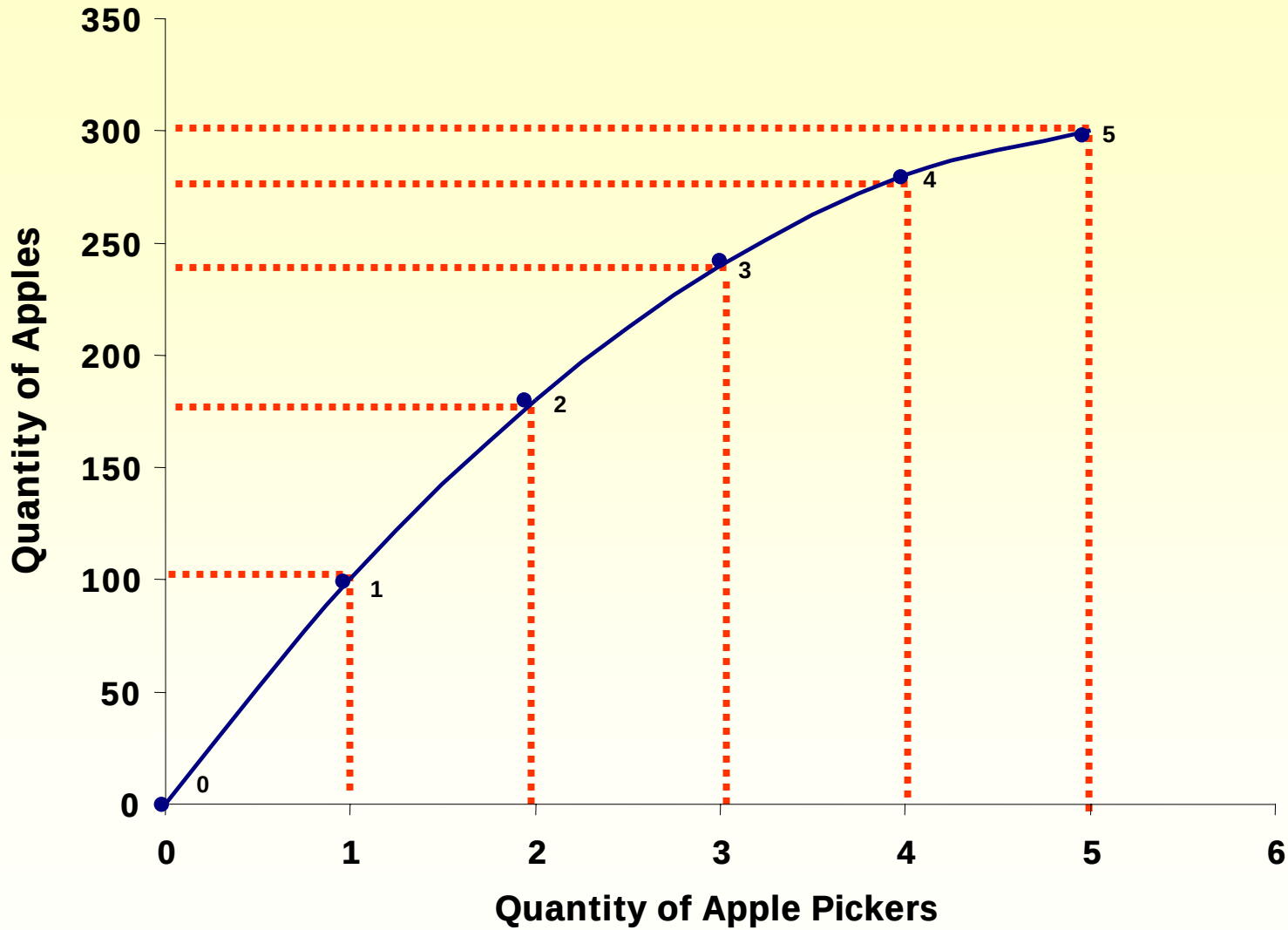
The Production Function...



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The Production Function and The Marginal Product of Labor

The marginal product of labor is the increase in the amount of output from an additional unit of labor.

$$MPL = \Delta Q / \Delta L$$

$$MPL = (Q2 - Q1) / (L2 - L1)$$

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Diminishing Marginal Product of Labor

- As the number of workers increases, the marginal product of labor declines.
- As more and more workers are hired, each additional worker contributes less to production than the prior one.
- The production function becomes flatter as the number of workers rises.

This property is called **diminishing marginal product.**

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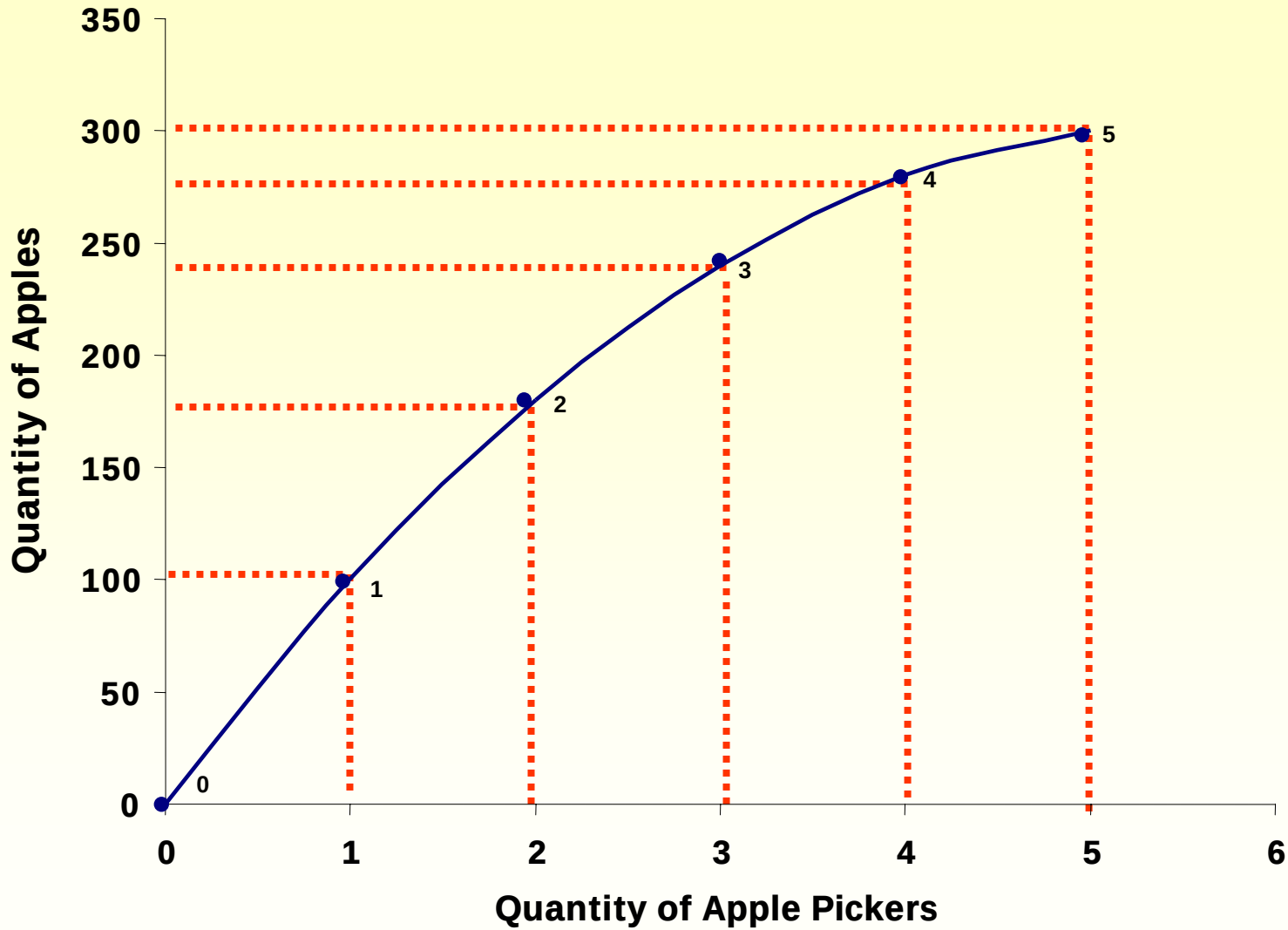
The Production Function...



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The Value of the Marginal Product of Labor

- **The value of the marginal product is the marginal product of the input multiplied by the market price of the output.**

$$VMPL = MPL \times P$$

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The Value of the Marginal Product of Labor

- The value of the marginal product is measured in dollars.
- It diminishes as the number of workers rises because the market price of the good is constant.

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The Value of the Marginal Product and the Demand for Labor

- To maximize profit, the competitive, profit-maximizing firm hires workers up to the point where the value of marginal product of labor equals the wage.

$$VMPL = Wage$$

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The Value of the Marginal Product and the Demand for Labor

The value-of-marginal-product curve is the labor demand curve for a competitive, profit-maximizing firm.

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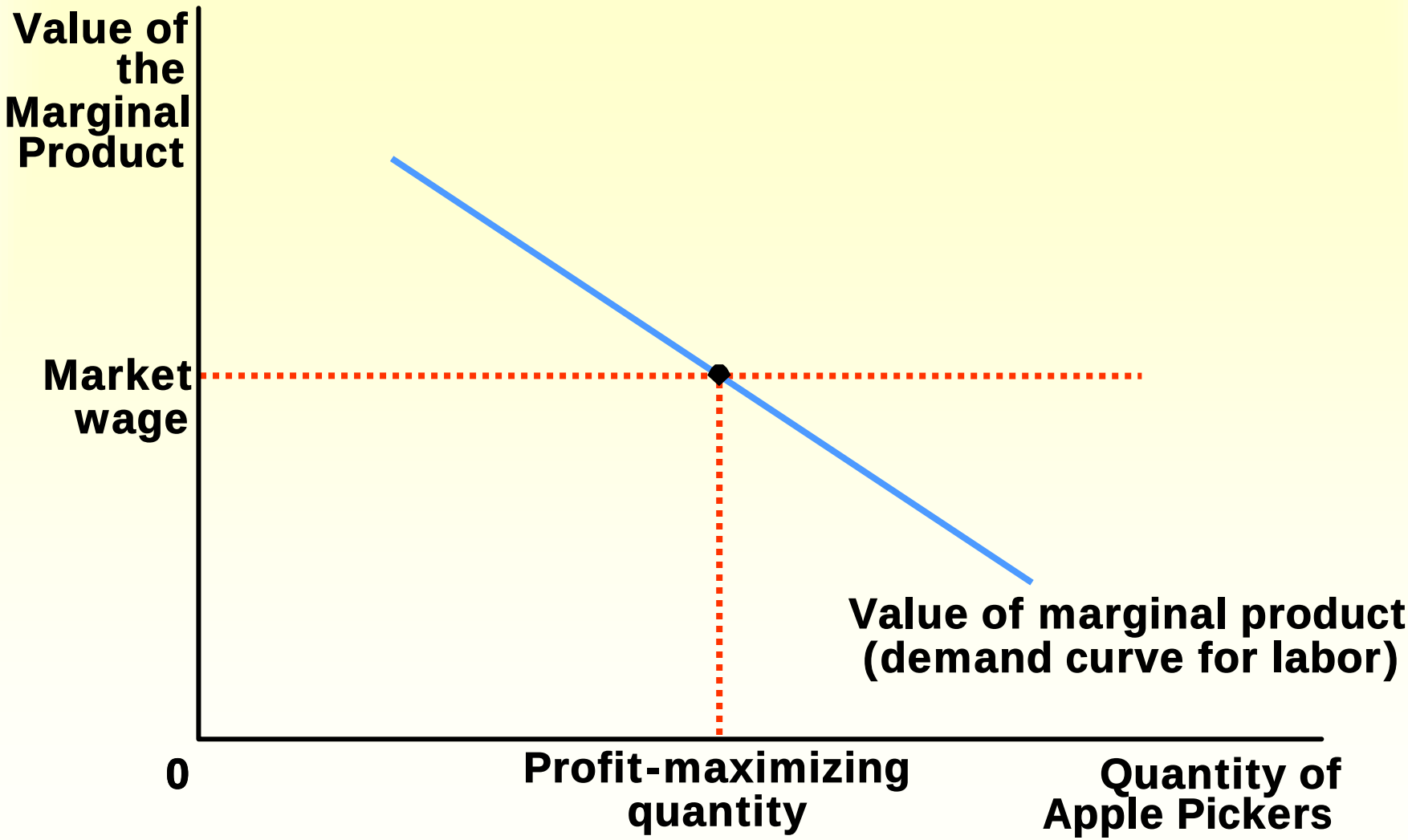
The Value of the Marginal Product of Labor...



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Input Demand and Output Supply

When a competitive firm hires labor up to the point at which the value of the marginal product equals the wage, it also produces up to the point at which the price equals the marginal cost.

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What Causes the Labor Demand Curve to Shift?

- Output Price
- Technological Change
- Supply of Other factors

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The Labor Supply Curve

- The labor supply curve reflects how workers' decisions about the labor-leisure tradeoff respond to changes in opportunity cost.
- An upward-sloping labor supply curve means that an increase in the wages induces workers to increase the quantity of labor they supply.

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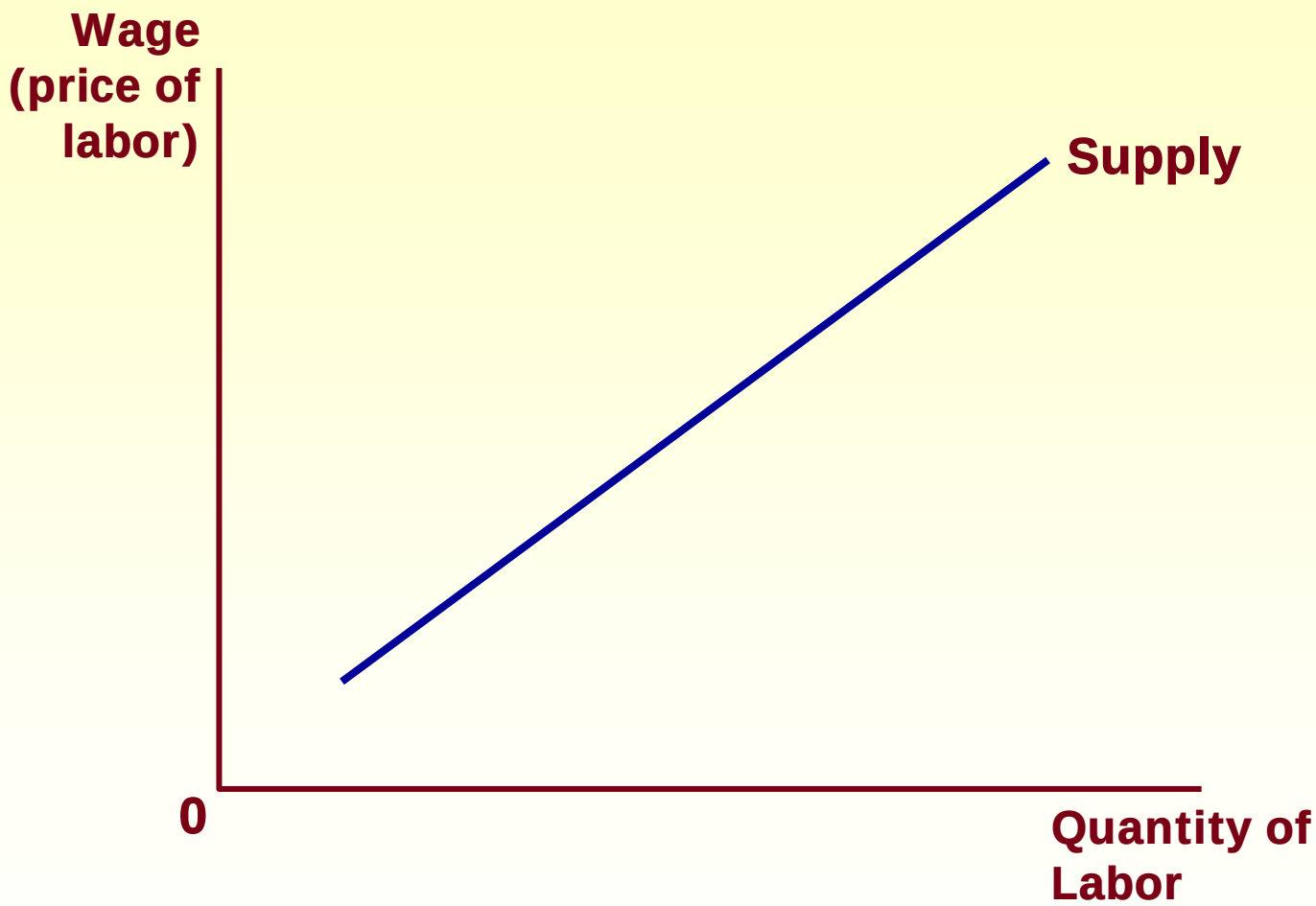
The Labor Supply Curve



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What Causes the Labor Supply Curve to Shift?

- Changes in Tastes
- Changes in Alternative Opportunities
- Immigration

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Equilibrium in the Labor Market

- The wage adjusts to balance the supply and demand for labor.
- The wage equals the value of the marginal product of labor.

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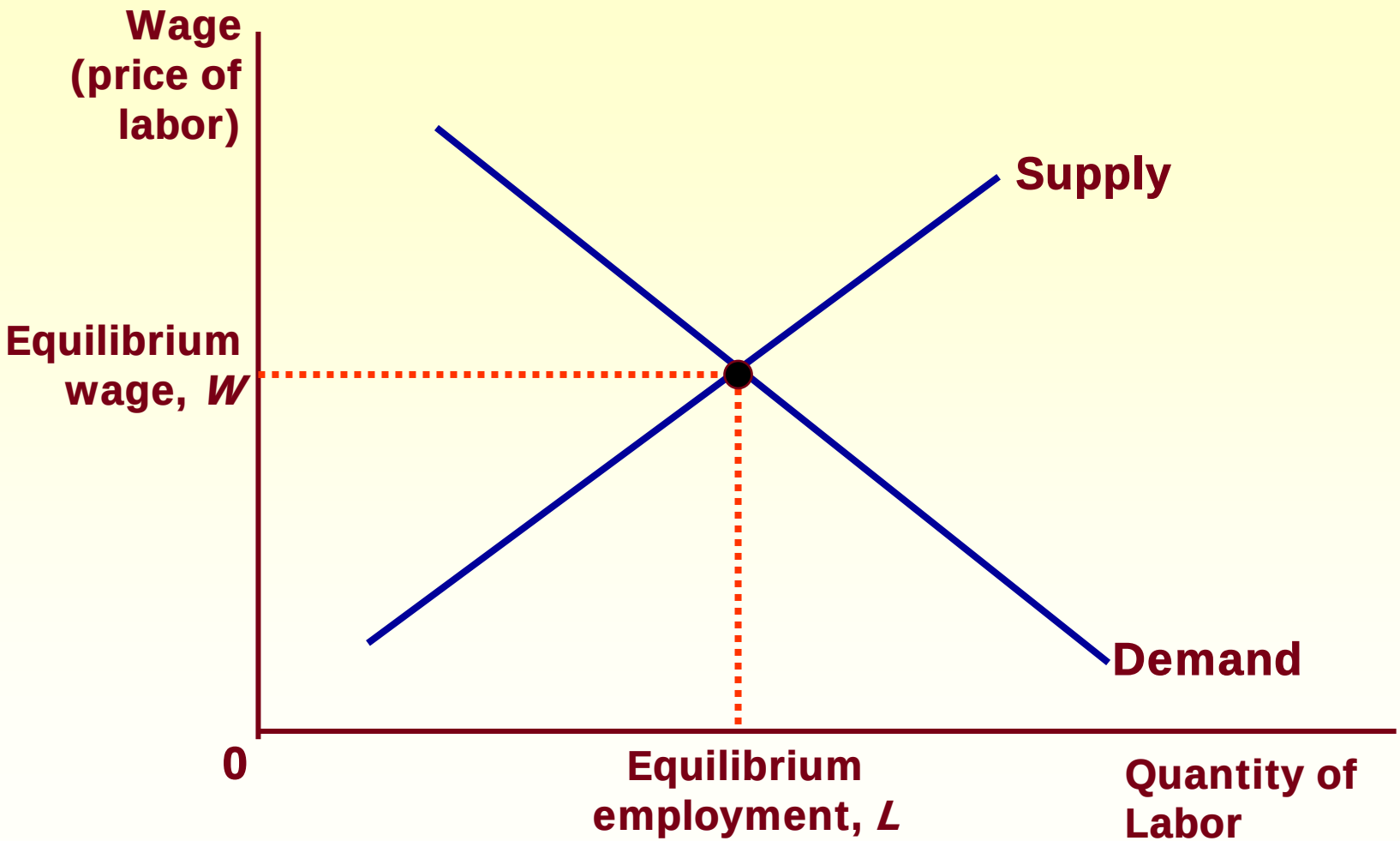
Equilibrium in the Labor Market...



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Equilibrium in the Labor Market

- Labor supply and labor demand determine the equilibrium wage.
- Shifts in the supply or demand curve for labor cause the equilibrium wage to change.

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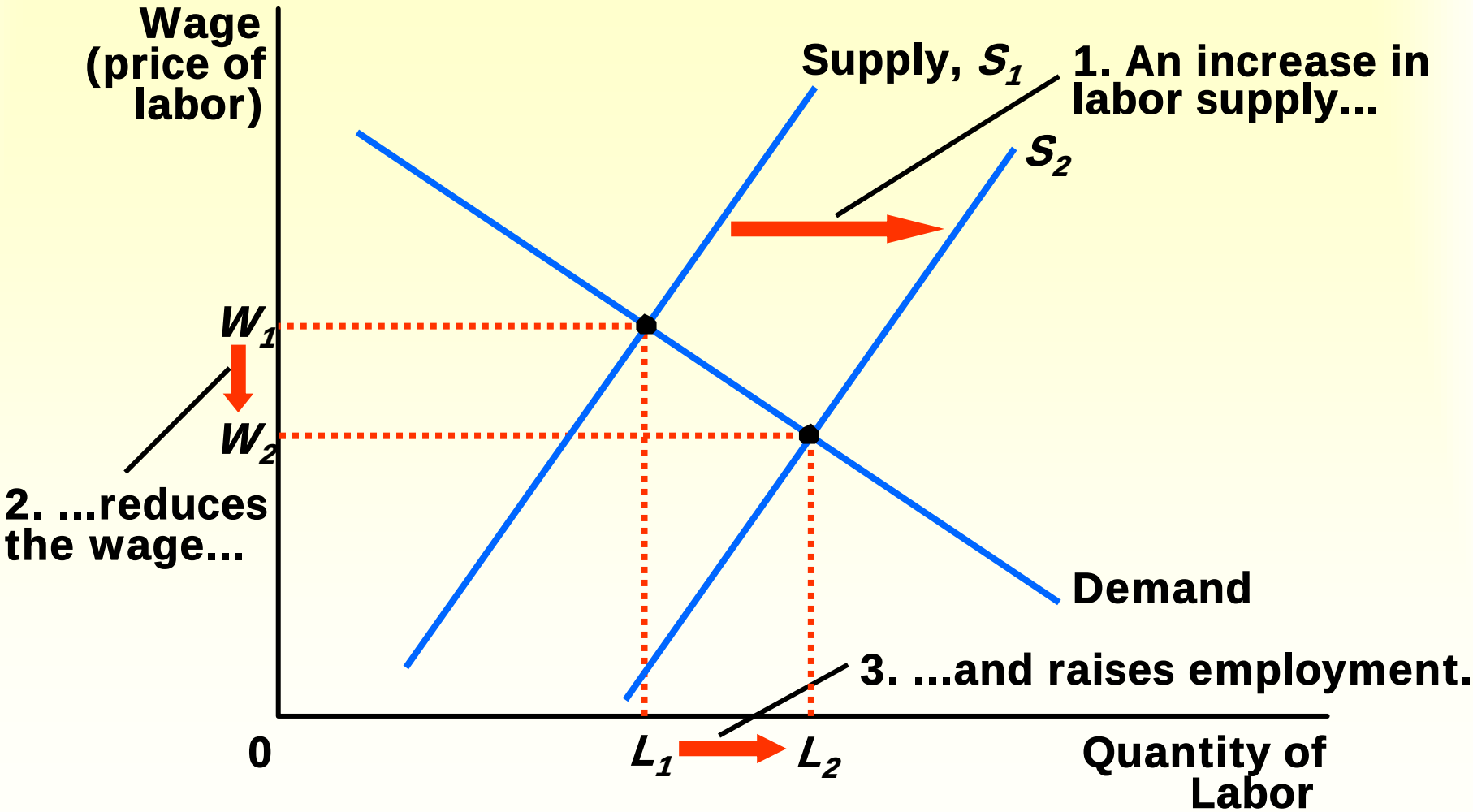
A Shift in Labor Supply...



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A Shift in Labor Supply

- An increase in the supply of labor :
  - Results in a surplus of labor.
  - Puts downward pressure on wages.
  - Makes it profitable for firms to hire more workers.
  - Results in diminishing marginal product.
  - Lowers the value of the marginal product.
  - Gives a new equilibrium.

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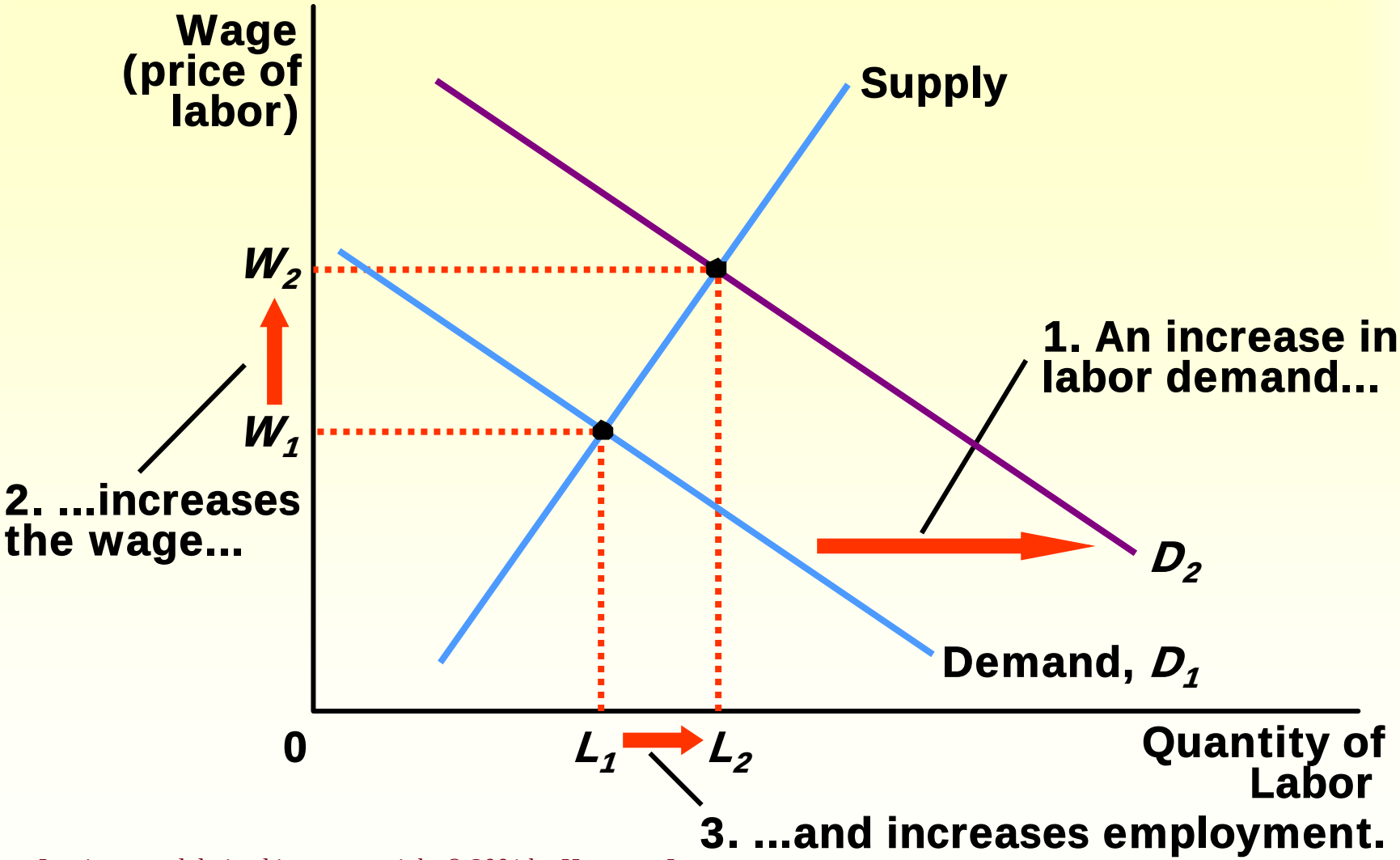
A Shift in Labor Demand...



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Shifts in Labor Demand

- An increase in the demand for labor :
  - Makes it profitable for firms to hire more workers.
  - Puts upward pressure on wages.
  - Raises the value of the marginal product.
  - Gives a new equilibrium.

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Three Determinants of Productivity

- **Physical Capital**
  - When workers work with a larger quantity of equipment and structures, they produce more.
- **Human Capital**
  - When workers are more educated, they produce more.
- **Technological Knowledge**
  - When workers have access to more sophisticated technologies, they produce more.

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Productivity and Wage Growth in the United States

Time Period	Growth Rate of Productivity	Growth Rate of Wages
1959 - 1997	1.8	1.7
1959 - 1973	2.9	2.9
1973 - 1997	1.1	1.0

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Productivity and Wage Growth around the World

Country	Growth Rate of Productivity	Growth Rate of Real Wages
South Korea	8.5	7.9
Hong Kong	5.5	4.9
Singapore	5.3	5.0
Indonesia	4.0	4.4
Japan	3.6	2.0
India	3.1	3.4
United Kingdom	2.4	2.4
United States	1.7	0.5
Brazil	0.4	-2.4
Mexico	-0.2	-3.0
Argentina	-0.9	-1.3
Iran	-1.4	-7.9

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Other Factors of Production: Land and Capital

- **Capital** refers to the stock of equipment and structures used for production.
  - The economy's capital represents the accumulation of goods produced in the past that are being used in the present to produce new goods and services.

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Prices of Land and Capital

- The **purchase price** is what a person pays to own a factor of production indefinitely.
- The **rental price** is what a person pays to use a factor of production for a limited period of time.

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Equilibrium in Markets for Land and Capital

- The rental price of land and the rental price of capital are determined by supply and demand.
  - The firm increases the quantity hired until the value of the factor's marginal product equals the factor's price.

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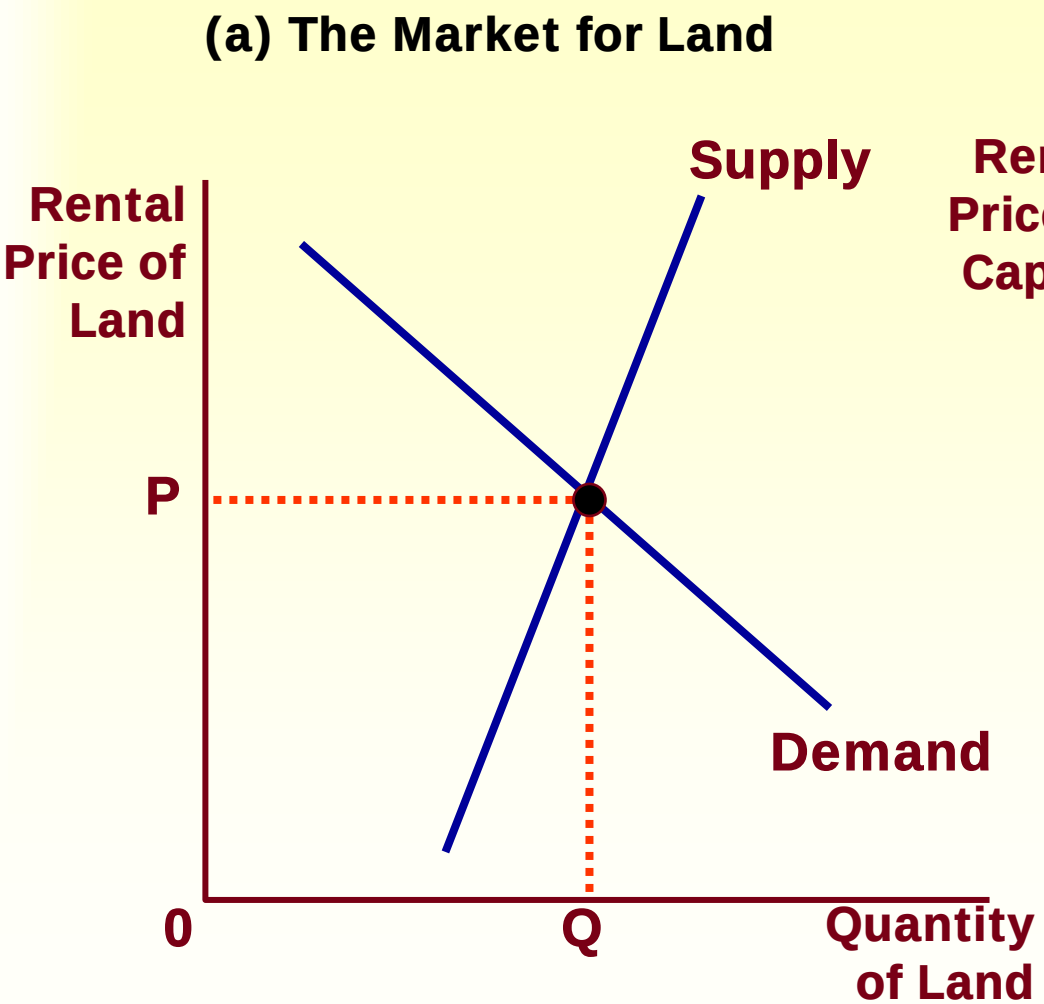
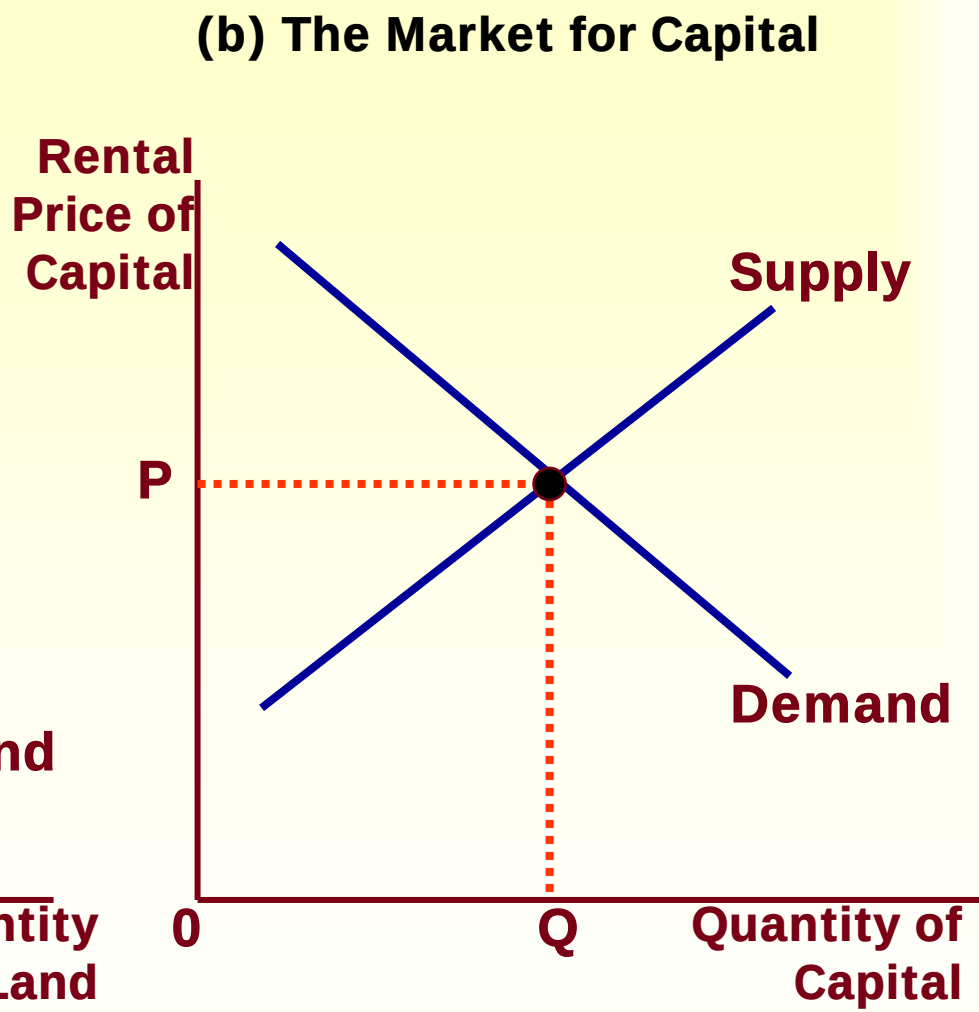
The Markets for Land and Capital...





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Equilibrium in Markets for Land and Capital

- Each factor's rental price must equal the value of their marginal product.
- They each earn the value of their marginal contribution to the production process.

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Linkages Among the Factors of Production

Factors of production are used together.

- **The marginal product of any one factor depends on the quantities of all factors that are available.**

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Linkages Among the Factors of Production

A change in the supply of one factor alters the earnings of all the factors.

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Linkages Among the Factors of Production

A change in earnings of any factor can be found by analyzing the impact of the event on the value of the marginal product of that factor.

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Summary

- The three most important factors of production are labor, land, and capital.
- The demand for factors, such as labor, is a derived demand that comes from firms that use the factors to produce goods and services.
- Competitive, profit-maximizing firms hire each factor up to the point at which the value of the marginal product of the factor equals its price.

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Summary

- The supply of labor arises from individuals' tradeoff between work and leisure.
- An upward-sloping labor supply curve means that people respond to an increase in the wage by enjoying less leisure and working more hours.

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Summary

- The price paid to each factor adjusts to balance the supply and demand for that factor.
- Because factor demand reflects the value of the marginal product of that factor, in equilibrium each factor is compensated according to its marginal contribution to the production of goods and services.

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Summary

- Because factors of production are used together, the marginal product of any one factor depends on the quantities of all factors that are available.
- As a result, a change in the supply of one factor alters the equilibrium earnings of all the factors.

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Graphical Review

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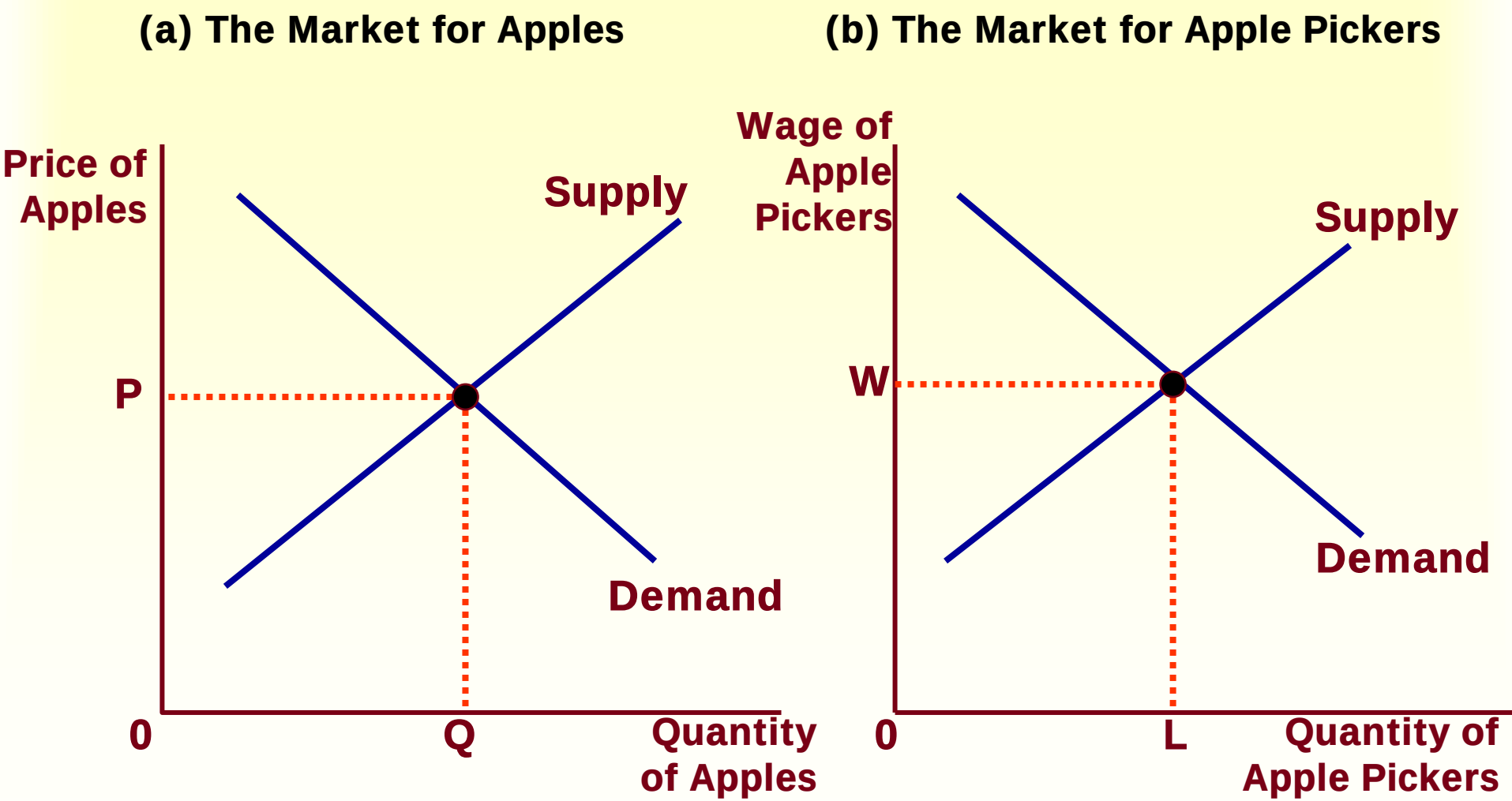

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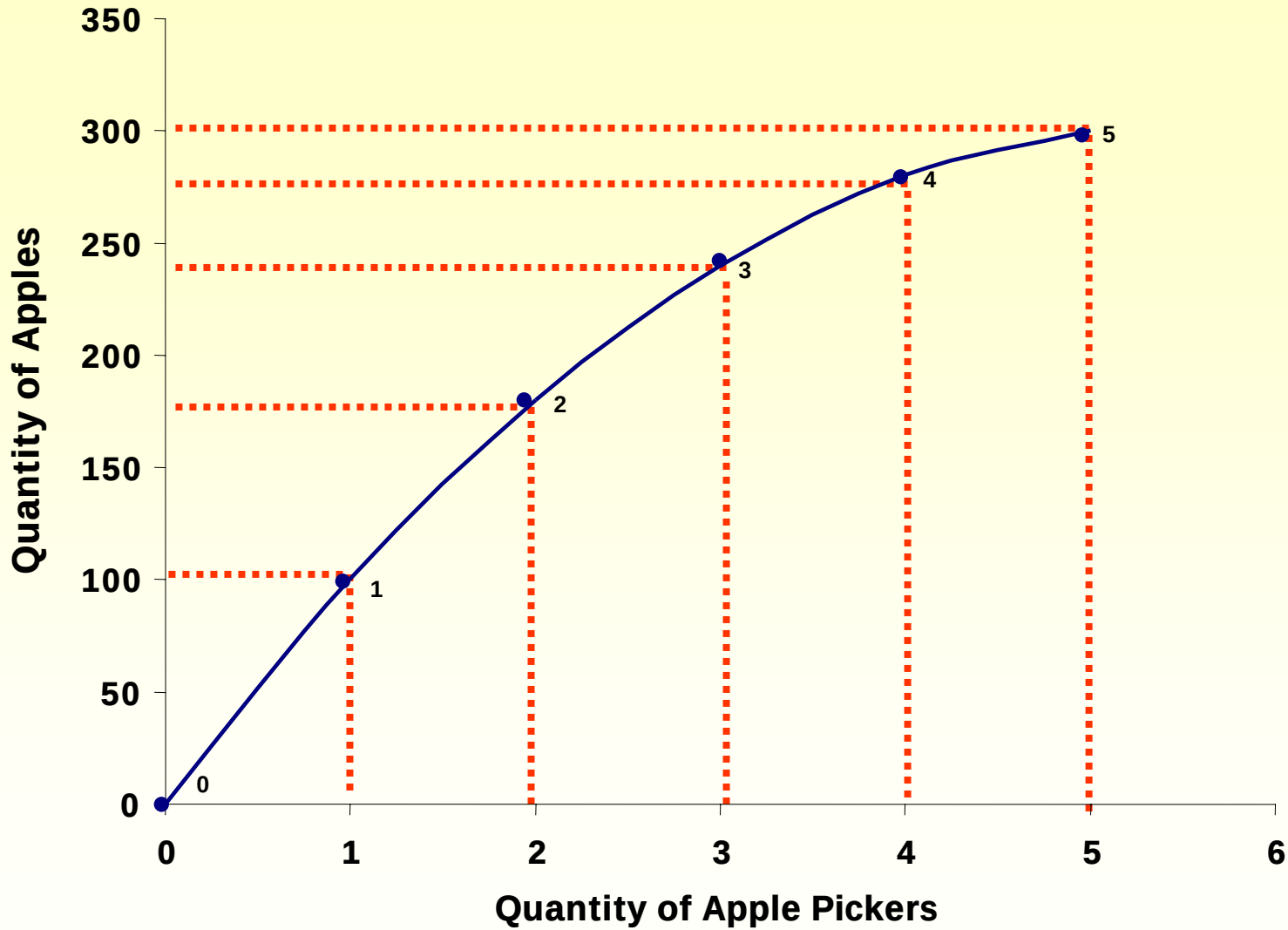
The Production Function...



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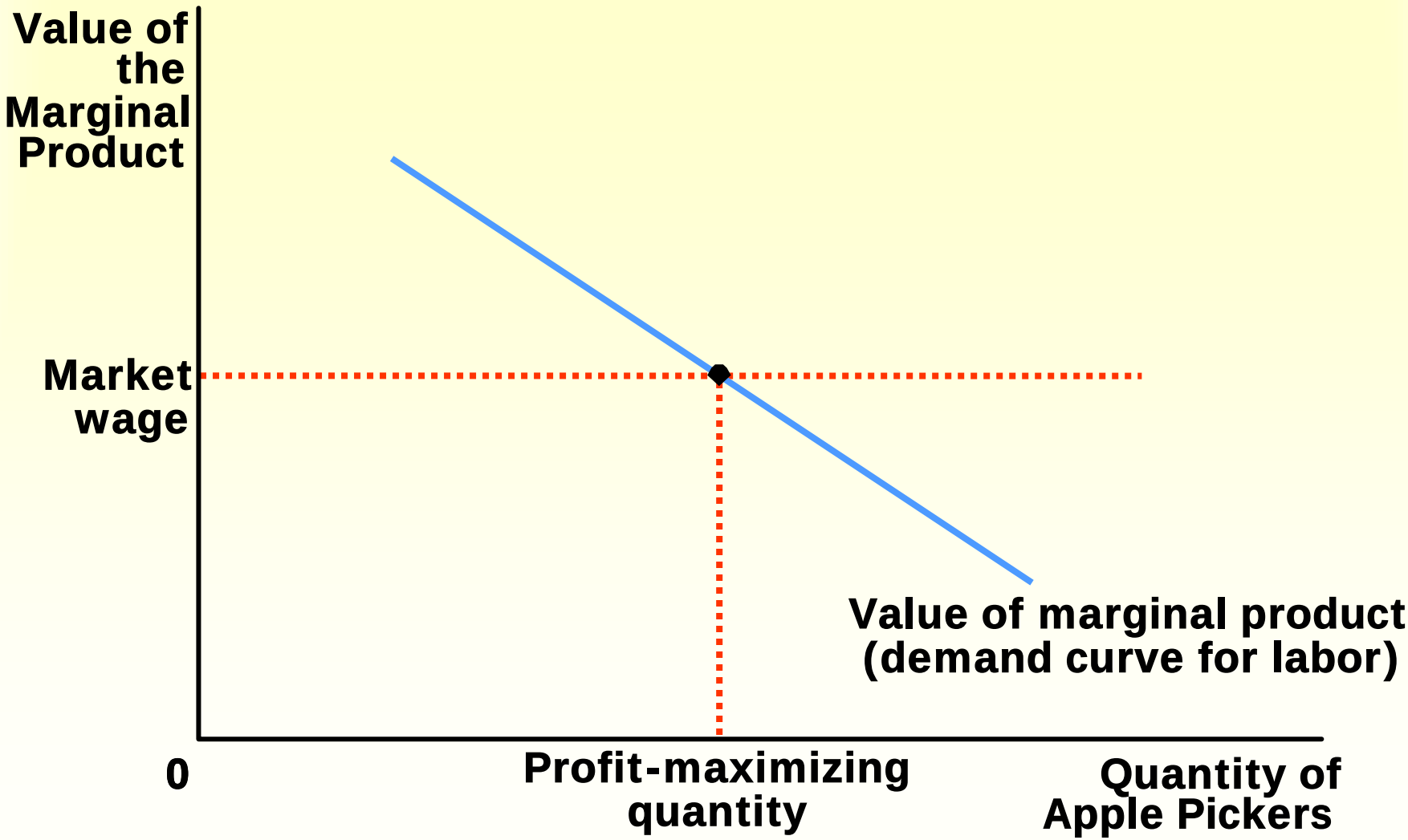
The Value of the Marginal Product of Labor...



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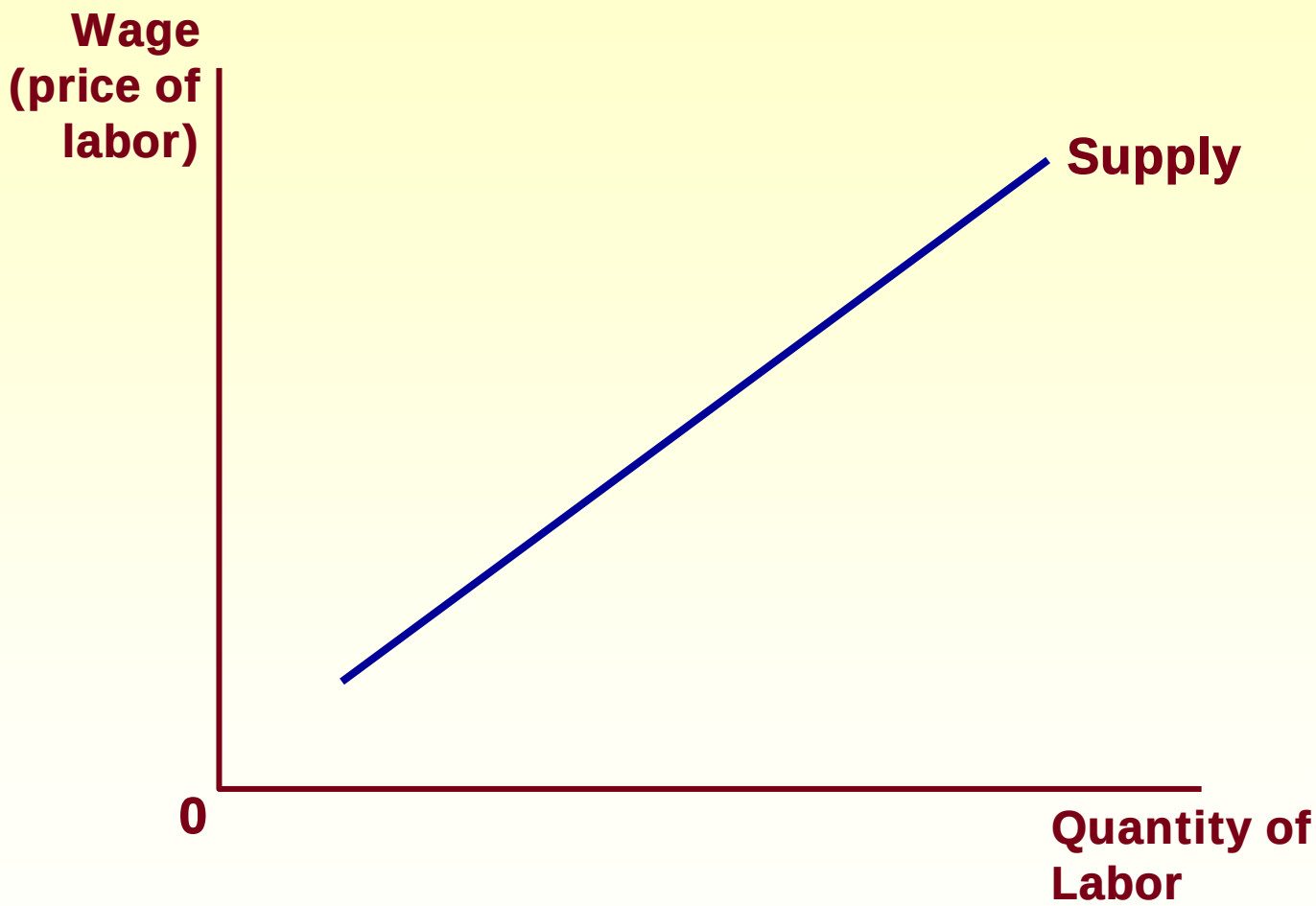
The Labor Supply Curve



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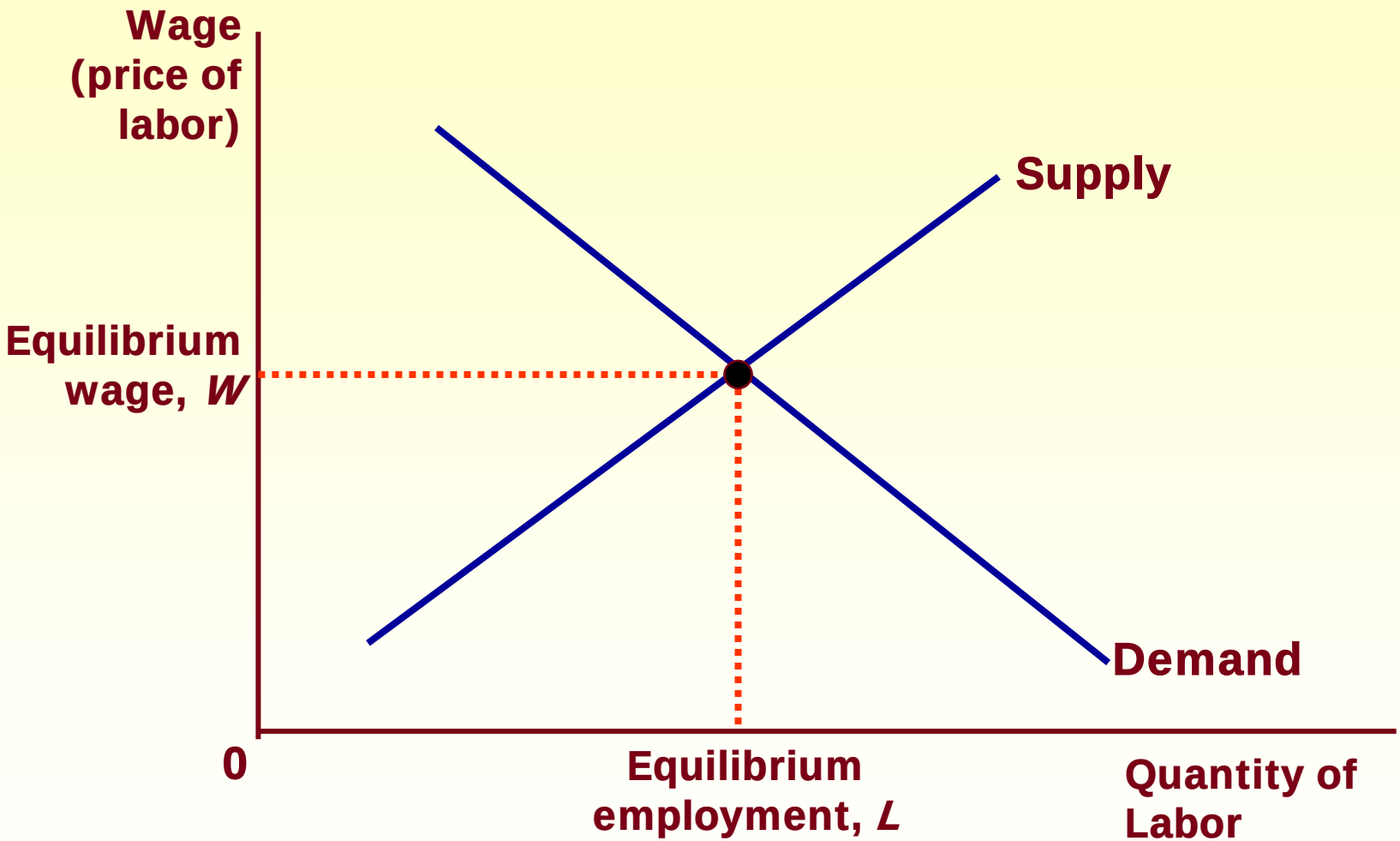
Equilibrium in the Labor Market...



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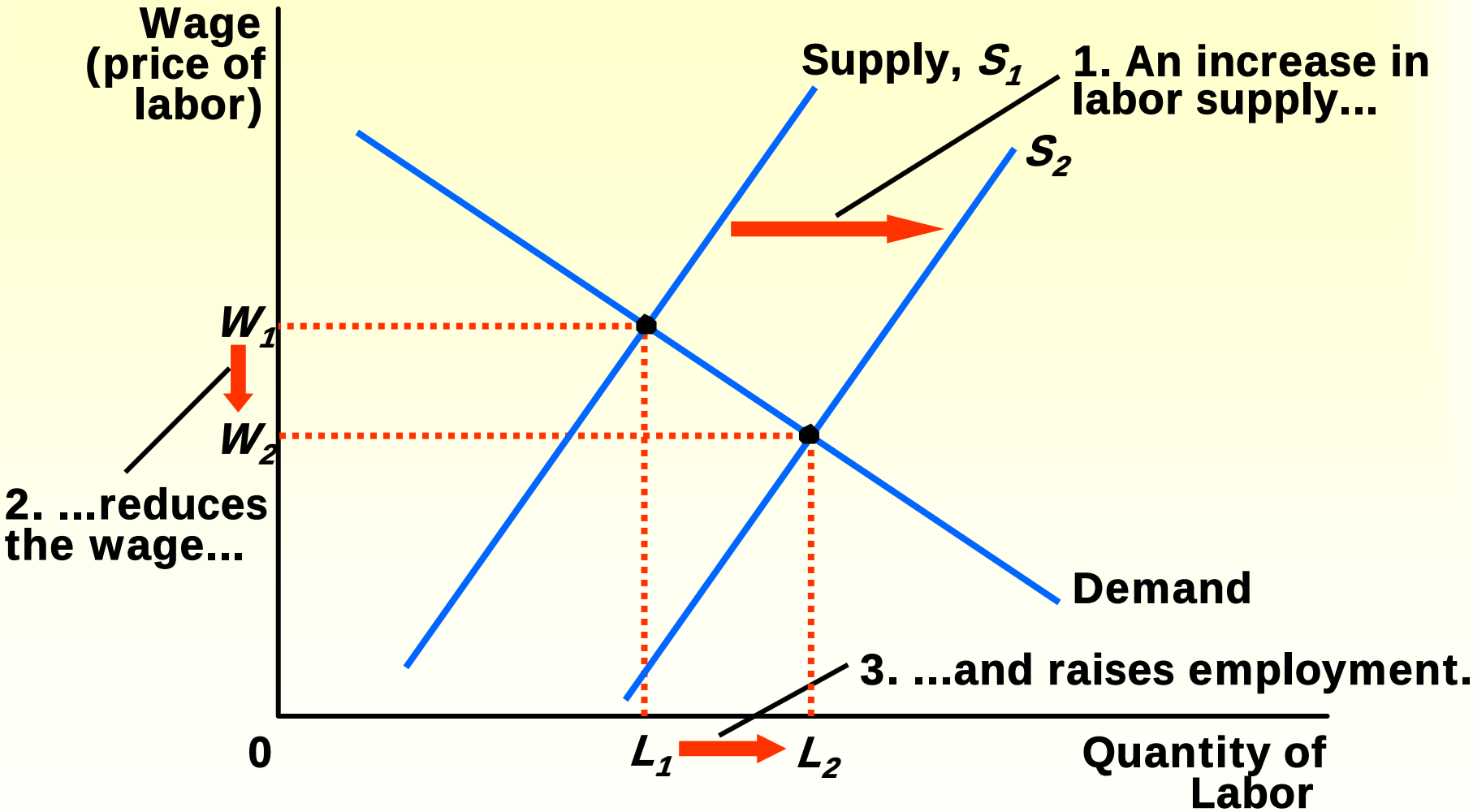
A Shift in Labor Supply...



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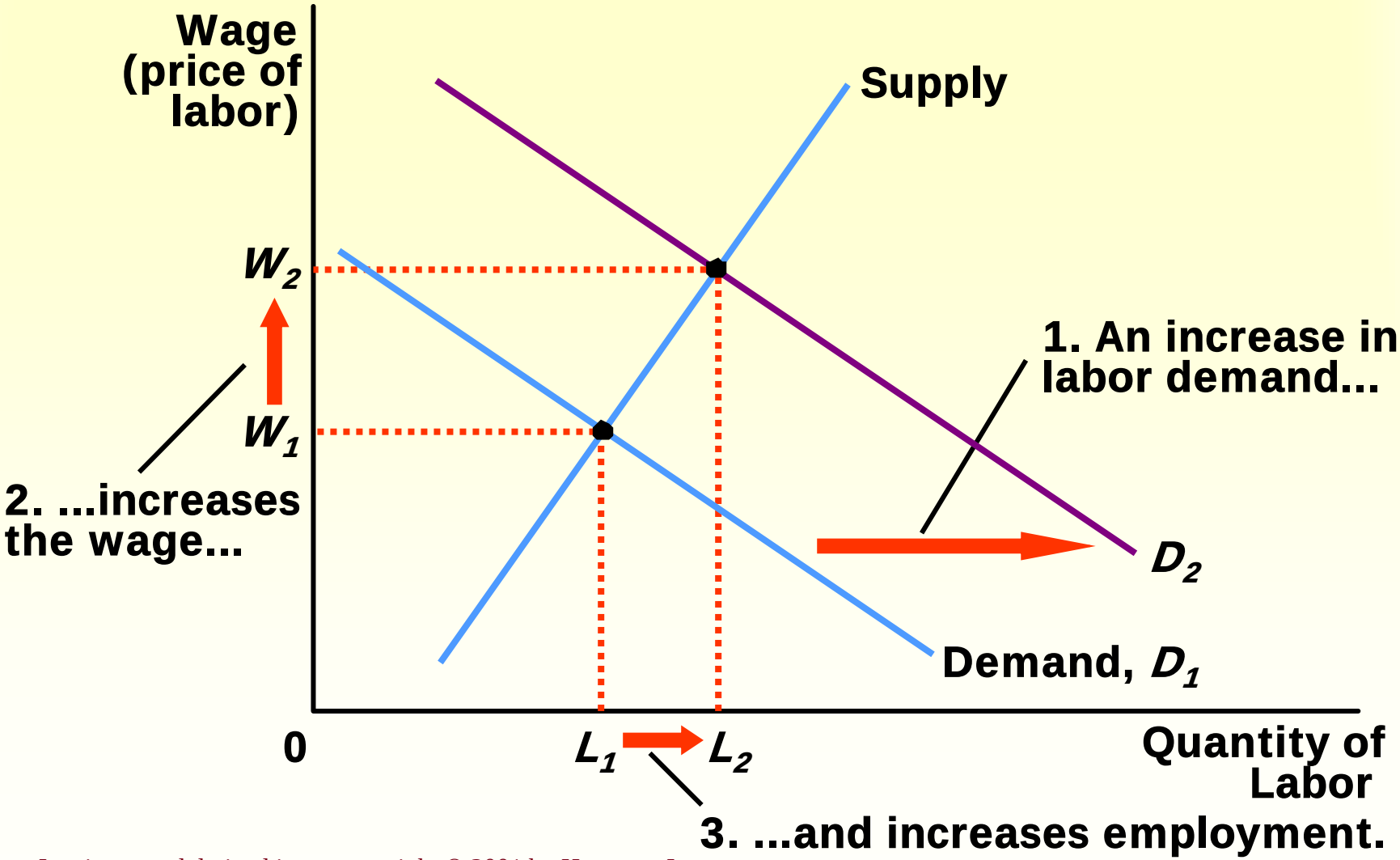
A Shift in Labor Demand...



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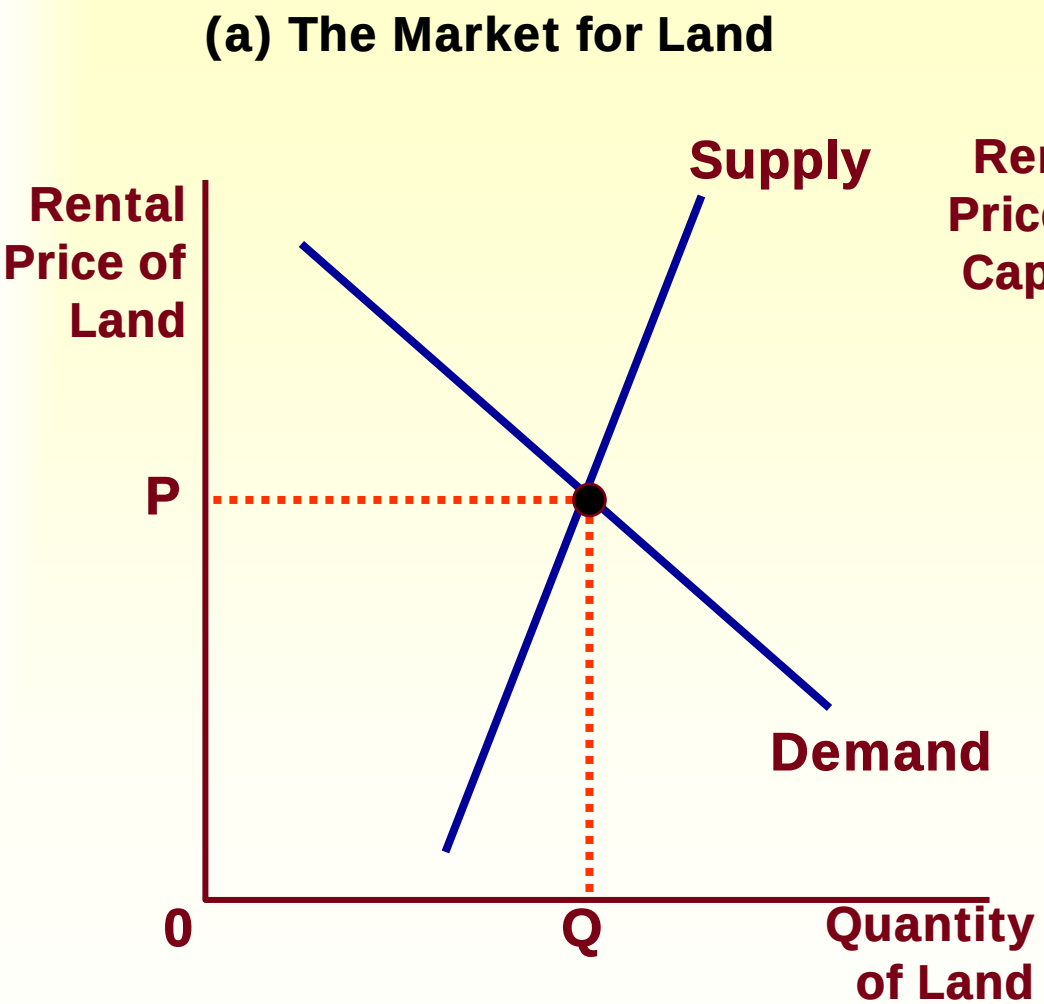
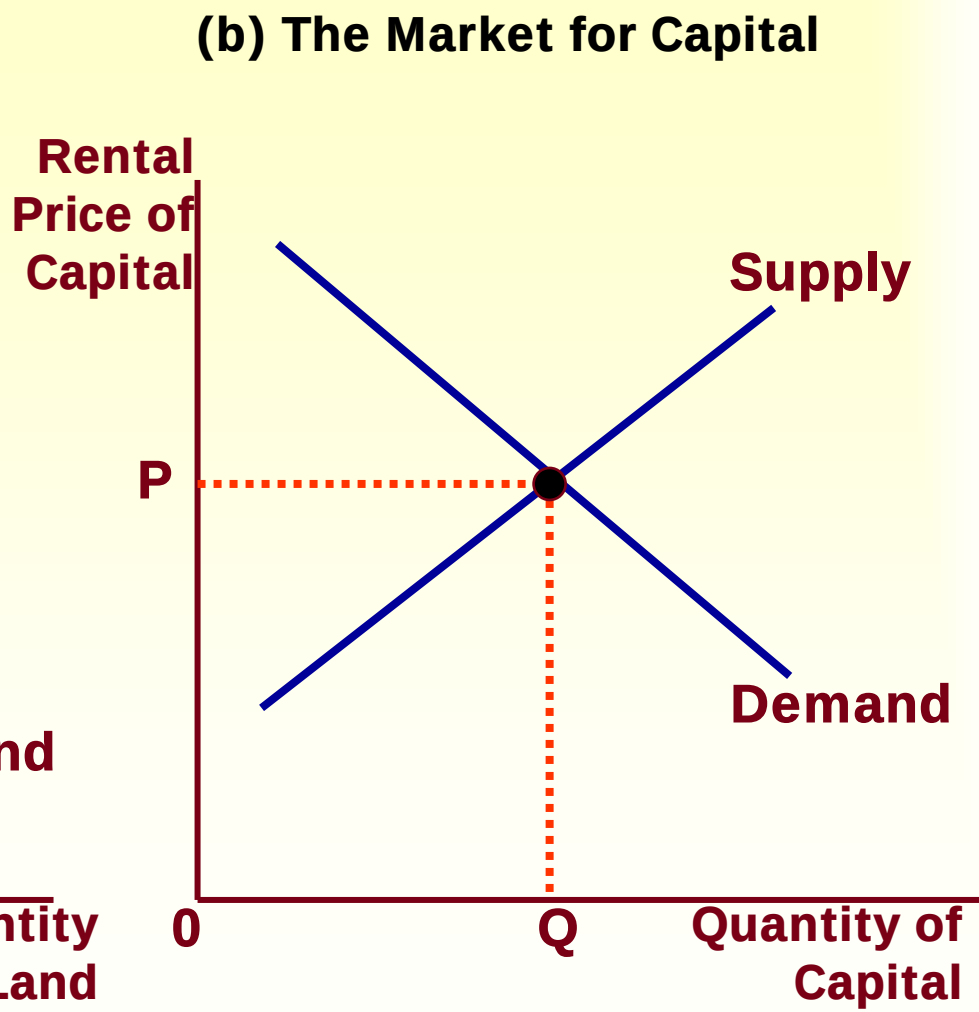
The Markets for Land and Capital...





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