PowerPoint® Lecture Presentation
to accompany
Principles of Economics, Fourth Edition
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Prepared by Kathryn Nantz and Laurence Miners, Fairfield University.

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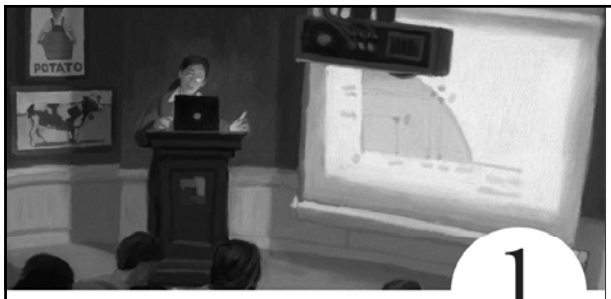

1

Ten Principles of Economics

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Economy. . .

. . . The word *economy* comes from a Greek word for "one who manages a household."

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TEN PRINCIPLES OF ECONOMICS

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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TEN PRINCIPLES OF ECONOMICS

- Society and Scarce Resources:
  - The management of society's resources is important because resources are scarce.
  - *Scarcity*. . . means that society has limited resources and therefore cannot produce all the goods and services people wish to have.

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TEN PRINCIPLES OF ECONOMICS

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

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HOW PEOPLE MAKE DECISIONS

- People face trade-offs.
- The cost of something is what you give up to get it.
- Rational people think at the margin.
- People respond to incentives.

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Principle #1: People Face Trade-offs.

- "There is no such thing as a free lunch!"

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Principle #1: People Face Trade-offs.

- 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

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Principle #1: People Face Trade-offs

- 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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Principle #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?
- The *opportunity cost* of an item is what you give up to obtain that item.

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Principle #2: The Cost of Something Is What You Give Up to Get It.

- Basketball star LeBron James understands opportunity costs and *incentives.* He chose to skip college and go straight from high school to the pros where he earns millions of dollars.

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Principle #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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Principle #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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HOW PEOPLE INTERACT

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

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Principle #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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Principle #6: Markets Are Usually a Good Way to Organize Economic Activity.

- A *market economy* is an economy that allocates resources through the decentralized decisions of many firms and households as they interact in markets for goods and services.
  - Households decide what to buy and who to work for.
  - Firms decide who to hire and what to produce.

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Principle #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."
  - 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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Principle #7: Governments Can Sometimes Improve Market Outcomes.

- Markets work only if property rights are enforced.
  - *Property rights* are the ability of an individual to own and exercise control over a scarce resource
- *Market failure* occurs when the market fails to allocate resources efficiently.
- When the market fails (breaks down) government can intervene to promote efficiency and equity.

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Principle #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.
  - *market power*, which is the ability of a single person or firm to unduly influence market prices.

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HOW THE ECONOMY AS A WHOLE WORKS

- A country's standard of living depends on its ability to produce goods and services.
- Prices rise when the government prints too much money.
- Society faces a short-run trade-off between inflation and unemployment.

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Principle #8: A Country's Standard of Living Depends on Its Ability to Produce Goods and Services.

- 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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Principle #8: A Country's Standard of Living Depends on Its Ability to Produce Goods and Services.

- Almost all variations in living standards are explained by differences in countries' productivities.
- *Productivity* is the amount of goods and services produced from each hour of a worker's time.

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Principle #8: A Country's Standard of Living Depends on Its Ability to Produce Goods and Services.

- 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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Principle #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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Principle #10: Society Faces a Short-run Trade-off between Inflation and Unemployment.

- The Phillips Curve illustrates the trade-off between inflation and unemployment:
  - Inflation or Unemployment
    - It's a short-run trade-off!
  - The trade-off plays a key role in the analysis of the *business cycle*—fluctuations in economic activity, such as employment and production

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Summary

- The principles of personal decision making are:
  - People face trade-offs.
  - The cost of something is what you give up to get it.
  - Rational people think at the margin.
  - People respond to incentives.

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Summary

- The principles of economic interaction are:
  - Trade can make everyone better off.
  - Markets are usually a good way to organize economic activity.
  - Governments can sometimes improve market outcomes.

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Summary

- The principles of the economy as a whole are:
  - A country's standard of living depends on its ability to produce goods and services.
  - Prices rise when the government prints too much money.
  - Society faces a short-run trade-off between inflation and unemployment.

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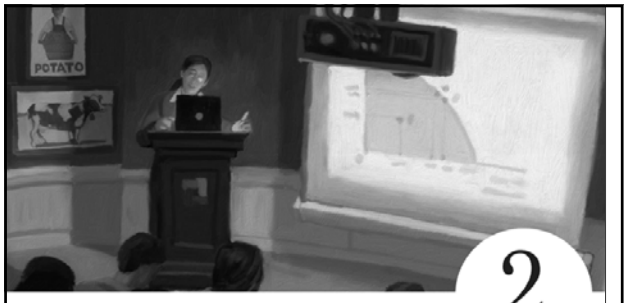

2

Thinking Like an Economist

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Thinking Like an Economist Summary

Every field of study has its own terminology

- Mathematics
  - integrals ❖ axioms ❖ vector spaces
- Psychology
  - ego ❖ id ❖ cognitive dissonance
- Law
  - promissory ❖ estoppel ❖ torts ❖ venues
- Economics
  - supply ❖ opportunity cost ❖ elasticity ❖ consumer surplus ❖ demand ❖ comparative advantage ❖ deadweight loss

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Thinking Like an Economist Summary

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 Summary

The economic way of thinking . . .

- Involves thinking analytically and objectively.
- Makes use of the scientific method.
- Uses abstract models to help explain how a complex, real world operates.
- Develops theories, collects and analyzes data to evaluate the theories.

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The Scientific Method: Observation, Theory, and More Observation Summary

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

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The Role of Assumptions Summary

- 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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Economic Models Summary

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

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Our First Model: The Circular-Flow Diagram

Summary

- The *circular-flow diagram* is a visual model of the economy that shows how dollars flow through markets among households and firms.

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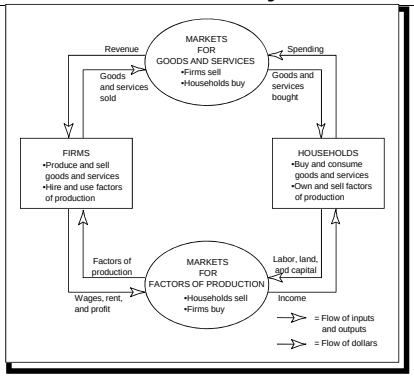
Figure 1 The Circular Flow

Summary



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Our First Model: The Circular-Flow Diagram

Summary

- 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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Our First Model: The Circular-Flow Diagram

Summary

- Markets for Goods and Services
  - Firms sell
  - Households buy
- Markets for Factors of Production
  - Households sell
  - Firms buy

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Our First Model: The Circular-Flow Diagram

Summary

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

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Our Second Model: The Production Possibilities Frontier

Summary

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

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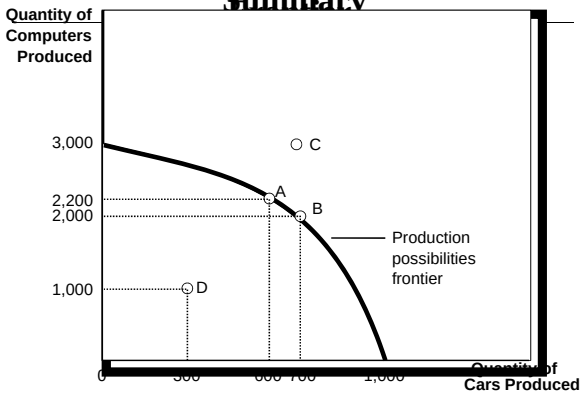
Figure 2 The Production Possibilities Summary



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Our Second Model: The Production Possibilities Frontier Summary

- Concepts illustrated by the production possibilities frontier
  - Efficiency
  - Trade-offs
  - Opportunity cost
  - Economic growth

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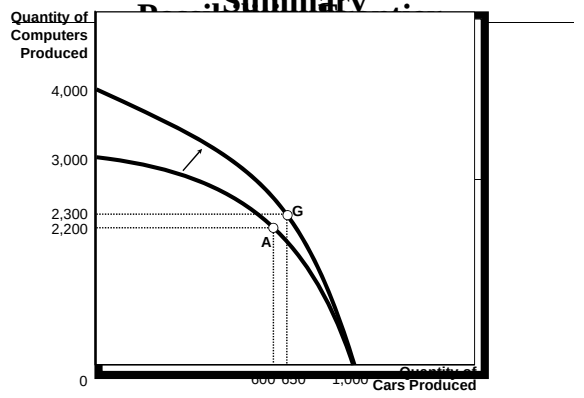
Figure 3 A Shift in the Production Possibilities Summary



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Microeconomics and Macroeconomics Summary

- *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.
  - Economy-wide phenomena, including inflation, unemployment, and economic growth

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THE ECONOMIST AS POLICY ADVISOR Summary

- When economists are trying to explain the world, they are scientists.
- When economists are trying to change the world, they are policy advisors.

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Positive versus Normative Analysis Summary

- *Positive statements* are statements that attempt to 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 Versus Normative Analysis Summary

- Are the following positive or normative statements?
  - An increase in the minimum wage will cause a decrease in employment among the least-skilled.
  - POSITIVE
  - Higher federal budget deficits will cause interest rates to increase.
  - POSITIVE

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Positive Versus Normative Analysis Summary

- Are the following positive or normative statements?
  - The income gains from a higher minimum wage are worth more than any slight reductions in employment.
  - NORMATIVE
  - State governments should be allowed to collect from tobacco companies the costs of treating smoking-related illnesses among the poor.
  - NORMATIVE

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Economists in Washington Summary

- . . . serve as advisers in the policymaking process of the three branches of government:
  - Legislative
  - Executive
  - Judicial

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Economists in Washington Summary

- Some government agencies that collect economic data and make economic policy include:
  - Department of Commerce
    - http://www.commerce.gov
  - Bureau of Labor Statistics
    - http://www.bls.gov
  - Congressional Budget Office
    - http://www.cbo.gov
  - Federal Reserve Board
    - http://www.federalreserve.gov

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WHY ECONOMISTS DISAGREE Summary

- They may disagree about the validity of alternative positive theories about how the world works.
- They may have different values and, therefore, different normative views about what policy should try to accomplish.

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TABLE 2

Ten Propositions about Which Most Economists Agree

Proposition (and percentage of economists who agree)
1. A ceiling on rents reduces the quantity and quality of housing available. (93%)
2. Tariffs and import quotas usually reduce general economic welfare. (93%)
3. Flexible and floating exchange rates offer an effective international monetary arrangement. (90%)
4. Fiscal policy (e.g., tax cut and/or government expenditure increase) has a significant stimulative impact on a less than fully employed economy. (90%)
5. If the federal budget is to be balanced, it should be done over the business cycle rather than yearly. (85%)
6. Cash payments increase the welfare of recipients to a greater degree than do transfers in-kind of equal cash value. (84%)
7. A large federal budget deficit has an adverse effect on the economy. (83%)
8. A minimum wage increases unemployment among young and unskilled workers. (79%)
9. The government should restructure the welfare system along the lines of a "negative income tax." (79%)
10. Effluent taxes and marketable pollution permits represent a better approach to pollution control than imposition of pollution ceilings. (78%)

Source: Richard M. Alston, J. R. Kearl, and Michael B. Vaughn, "Is There Consensus among Economists in the 1990s?" American Economic Review (May 1992): 203–09. Reprinted by permission.

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Summary

- Economists try to address their subjects with a scientist's objectivity.
  - They make appropriate assumptions and build simplified models in order to understand the world around them.
  - Two simple economic models are the circular-flow diagram and the production possibilities frontier.

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Summary

- Economics is divided into two subfields:
  - Microeconomics is the study of decision-making by households and firms in the marketplace.
  - Macroeconomics is the study of the forces and trends that affect the economy as a whole.

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Summary

- A positive statement is an assertion about how the world is.
- A normative statement is an assertion about how the world ought to be.
- When economists make normative statements, they are acting more as policy advisors than scientists.

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Summary

- Economists who advise policymakers offer conflicting advice either because of differences in scientific judgments or because of differences in values.
- At other times, economists are united in the advice they offer, but policymakers may choose to ignore it.

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3

Interdependence and the Gains from Trade

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Summary

Consider your typical day:

- You wake up to an alarm clock made in Korea.
- You pour yourself orange juice made from Florida oranges and coffee from beans grown in Brazil.
- 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 the Gains from Trade Summary

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

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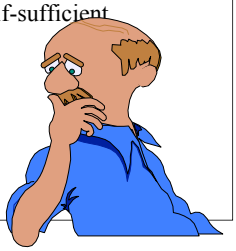
Interdependence and the Gains from Trade Summary

- 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 the Gains from Trade Summary

- Individuals and nations rely on specialized production and exchange as a way to address problems caused by scarcity.
- But this gives rise to two questions:
  - Why is interdependence the norm?
  - What determines production and trade?

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Interdependence and the Gains from Trade Summary

- Why is interdependence the norm?
  - Interdependence occurs because people are better off when they specialize and trade with others.
- What determines the pattern of production and trade?
  - Patterns of production and trade are based upon differences in opportunity costs.

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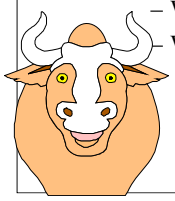
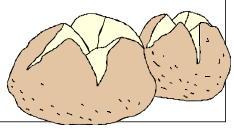
A PARABLE FOR THE MODERN ECONOMY Summary

Imagine an economic system with only two goods, *potatoes and meat* and only two people, *a potato farmer and a cattle rancher*

- What should each person produce?
- Why should these people trade?





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Summary

TABLE 1
The Production Opportunities of the Farmer and the Rancher

	Minutes Needed to Make 1 Ounce of:		Amount Produced in 8 Hours	
	Meat	Potatoes	Meat	Potatoes
Farmer	60 min/oz	15 min/oz	8 oz	32 oz
Rancher	20 min/oz	10 min/oz	24 oz	48 oz

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Production Possibilities Summary

- Suppose the farmer and rancher decide not to engage in trade:
  - Each consumes only what he or she can produce alone.
  - The production possibilities frontier is also the consumption possibilities frontier.
  - Without trade, economic gains are diminished.

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Figure 1 The Production Possibilities Frontier Summary

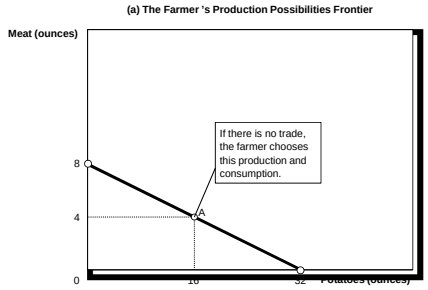

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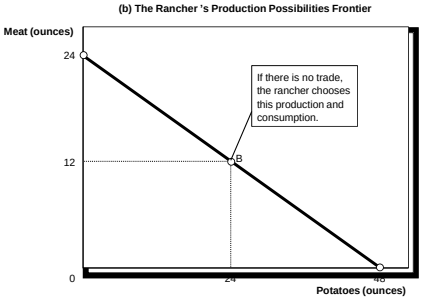
Figure 1 The Production Possibilities Curve Summary



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Production and Consumption Without Trade Summary

	Farmer		Rancher	
	Meat	Potatoes	Meat	Potatoes
Without Trade:				
Production and Consumption	4 oz	16 oz	12 oz	24 oz

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Specialization and Trade Summary

- Suppose instead the farmer and the rancher decide to specialize and trade…
  - Both would be better off if they specialize in producing the product they are more suited to produce, and then trade with each other.

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Figure 2 How Trade Expands the Set of Consumption Opportunities Summary

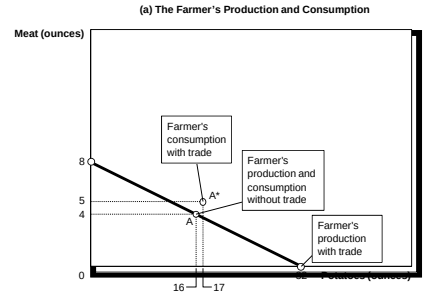

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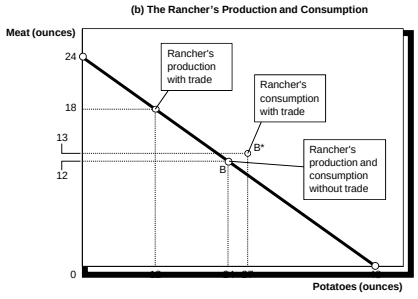
Figure 2 How Trade Expands the Set of Consumption Opportunities



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Summary

COMPARATIVE ADVANTAGE Summary

- Differences in the costs of production determine the following:
  - Who should produce what?
  - How much should be traded for each product?

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COMPARATIVE ADVANTAGE Summary

- 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 Summary

- The comparison among producers of a good according to their productivity.
  - 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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Absolute Advantage Summary

- The Rancher needs only 10 minutes to produce an ounce of potatoes, whereas the Farmer needs 15 minutes.
- The Rancher needs only 20 minutes to produce an ounce of meat, whereas the Farmer needs 60 minutes.

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Opportunity Cost and Comparative Advantage Summary

- Compares producers of a good according to their *opportunity cost*, that is, what must be given up to obtain some item
- The producer who has the smaller opportunity cost of producing a good is said to have a *comparative advantage* in producing that good.

? ?

Who has the comparative advantage in the production of each good?

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Comparative Advantage and Trade Summary

- Potato costs…
  - The Rancher's opportunity cost of an ounce of potatoes is ¼ an ounce of meat.
  - The Farmer's opportunity cost of an ounce of potatoes is ½ an ounce of meat.
- Meat costs…
  - The Rancher's opportunity cost of a pound of meat is only 4 ounces of potatoes.
  - The Farmer's opportunity cost of an ounce of meat is only 2 ounces of potatoes...

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Comparative Advantage and Trade Summary

…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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Comparative Advantage and Trade Summary

- 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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Gains from Trade Summary

	Farmer		Rancher	
	Meat	Potatoes	Meat	Potatoes
With Trade:				
Production	0 oz	32 oz	18 oz	12 oz
Trade	Gets 5 oz	Gives 15 oz	Gives 5 oz	Gets 15 oz
Consumption	5 oz	17 oz	13 oz	27 oz
GAINS FROM TRADE:				
Increase in Consumption	+1 oz	+1 oz	+1 oz	+3 oz

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Comparative Advantage and Trade Summary

- 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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FYI—The Legacy of Adam Smith and David Ricardo Summary

- Adam Smith
  - 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.
- David Ricardo
  - 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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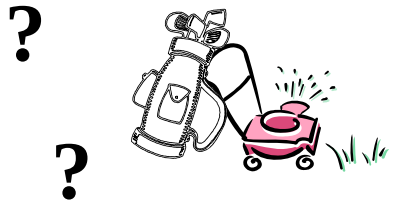
Summary
APPLICATIONS OF COMPARATIVE ADVANTAGE

- Should Tiger Woods Mow His Own Lawn?



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Summary
APPLICATIONS OF COMPARATIVE ADVANTAGE

Should the United States trade with other countries?

- Each country has many citizens with different interests. International trade can make some individuals worse off, even as it makes the country as a whole better off.
  - *Imports*—goods produced abroad and sold domestically
  - *Exports*—goods produced domestically and sold abroad

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Summary

- Each person consumes goods and services produced by many other people both in our country and around the world.
- Interdependence and trade are desirable because they allow everyone to enjoy a greater quantity and variety of goods and services.

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Summary

- There are two ways to compare the ability of two people producing a good.
  - 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.
- Trade makes everyone better off because it allows people to specialize in those activities in which they have a comparative advantage.
- The principle of comparative advantage applies to countries as well as people.

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4

The Market Forces of Supply and Demand

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MARKETS AND COMPETITION Summary

- 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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What Is a Market? Summary

- 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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What Is a Market? Summary

- Buyers determine *demand*.
- Sellers determine *supply*.

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What Is Competition? Summary

- A *competitive market* is a market in which there are many buyers and sellers so that each has a negligible impact on the market price.

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What Is Competition? Summary

- 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
  - Monopoly
    - One seller, and seller controls price

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What Is Competition? Summary

- Competition: Perfect and Otherwise
  - Oligopoly
    - Few sellers
    - Not always aggressive competition
  - Monopolistic Competition
    - Many sellers
    - Slightly differentiated products
    - Each seller may set price for its own product

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DEMAND Summary

- *Quantity demanded* is the amount of a good that buyers are willing and able to purchase.
- Law of Demand
  - The *law of demand* states that, other things equal, the quantity demanded of a good falls when the price of the good rises.

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The Demand Curve: The Relationship between Price and Summary

- 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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Catherine's Demand Schedule Summary

Price of Ice-Cream Cone	Quantity of Cones Demanded
$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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The Demand Curve: The Relationship between Price and Summary

- Demand Curve
  - The *demand curve* is a graph of the relationship between the price of a good and the quantity demanded.

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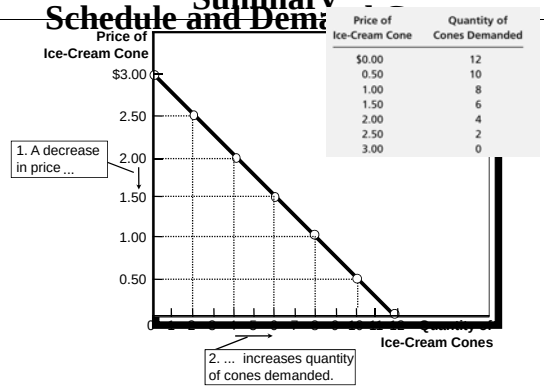
Figure 1 Catherine's Demand Schedule and Dema Summary



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Market Demand versus Individual Demand Summary

- 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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The Market Demand Curve Summary

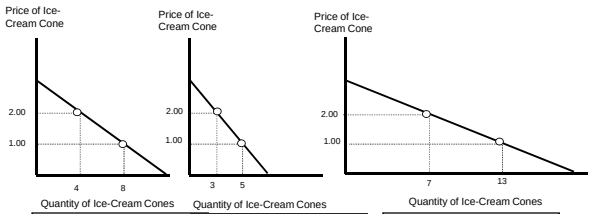
The market demand curve is the horizontal sum of the individual demand curves!

When the price is $2.00, Catherine will demand 4 ice-cream cones.

When the price is $2.00, Nicholas will demand 3 ice-cream cones.

The market demand at $2.00 will be 7 ice-cream cones.

Catherine's Demand + Nicholas's Demand = Market Demand



When the price is $1.00, Catherine will demand 8 ice-cream cones.

When the price is $1.00, Nicholas will demand 5 ice-cream cones.

The market demand at $1.00, will be 13 ice-cream cones.

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Shifts in the Demand Curve Summary

- Change in Quantity Demanded
  - Movement along the demand curve.
  - Caused by a change in the price of the product.

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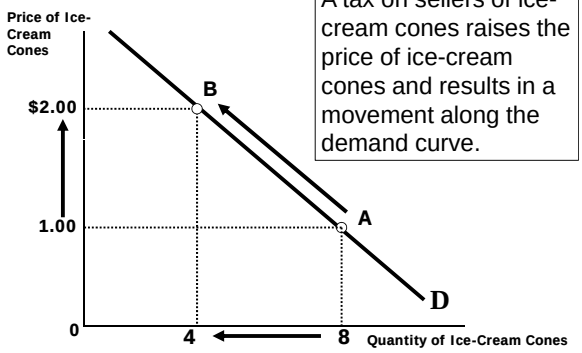
Changes in Quantity Demanded Summary

A tax on sellers of ice-cream cones raises the price of ice-cream cones and results in a movement along the demand curve.



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Shifts in the Demand Curve Summary

- Consumer income
- Prices of related goods
- Tastes
- Expectations
- Number of buyers

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Shifts in the Demand Curve Summary

- Change in Demand
  - A shift in the demand curve, either to the left or right.
  - Caused by any change that alters the quantity demanded at every price.

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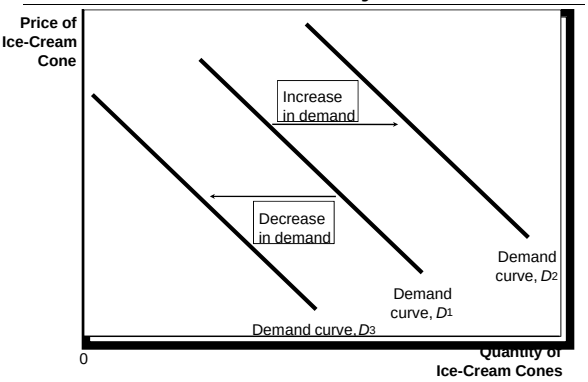
Figure 3 Shifts in the Demand Curve Summary



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Shifts in the Demand Curve Summary

- 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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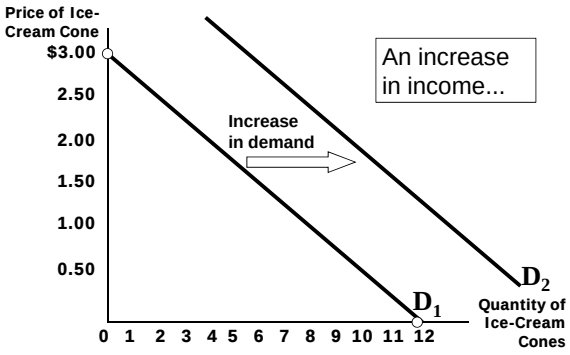
Consumer Income Normal Good Summary



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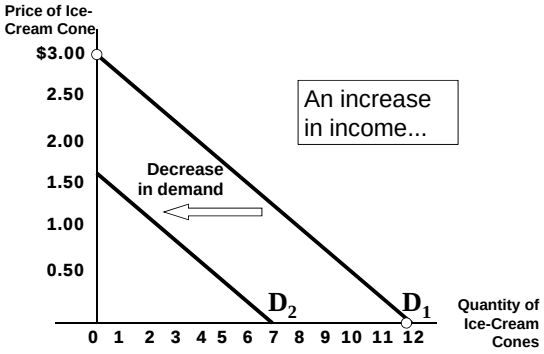
Consumer Income Inferior Good Summary



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Shifts in the Demand Curve Summary

- Prices of Related Goods
  - 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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Table 1 Variables That Influence Buyers Summary

Variable	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 Summary

- *Quantity supplied* is the amount of a good that sellers are willing and able to sell.
- Law of Supply
  - The *law of supply* states that, other things equal, the quantity supplied of a good rises when the price of the good rises.

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The Supply Curve: The Relationship between Price and Quantity Summary

- 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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Ben's Supply Schedule Summary

Price of Ice-Cream Cone	Quantity of Cones Supplied
$0.00	0 cones
0.50	0
1.00	1
1.50	2
2.00	3
2.50	4
3.00	5

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The Supply Curve: The Relationship between Price and Quantity Summary

- Supply Curve
  - The *supply curve* is the graph of the relationship between the price of a good and the quantity supplied.

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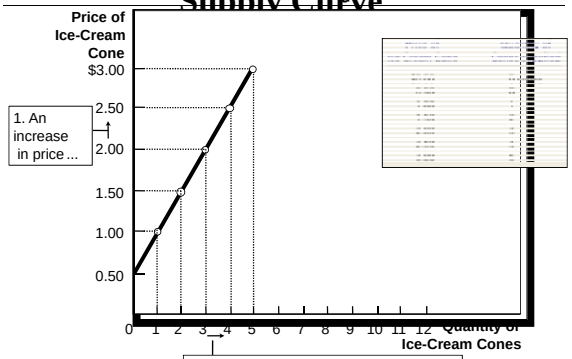
Figure 5 Ben's Supply Schedule and Supply Curve Summary



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Market Supply versus Individual Supply Summary

- 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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Shifts in the Supply Curve Summary

- Input prices
- Technology
- Expectations
- Number of sellers

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Shifts in the Supply Curve Summary

- Change in Quantity Supplied
  - Movement along the supply curve.
  - Caused by a change in anything that alters the quantity supplied at each price.

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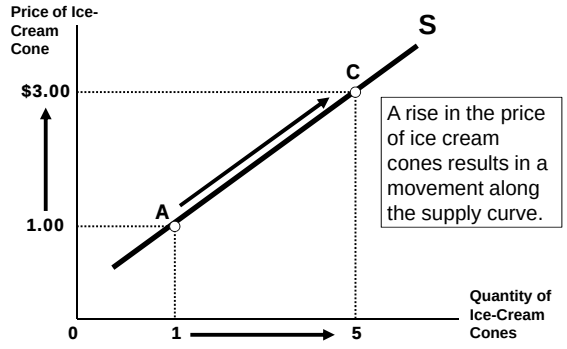
Change in Quantity Supplied Summary



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Shifts in the Supply Curve Summary

- 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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Figure 7 Shifts in the Supply Curve Summary

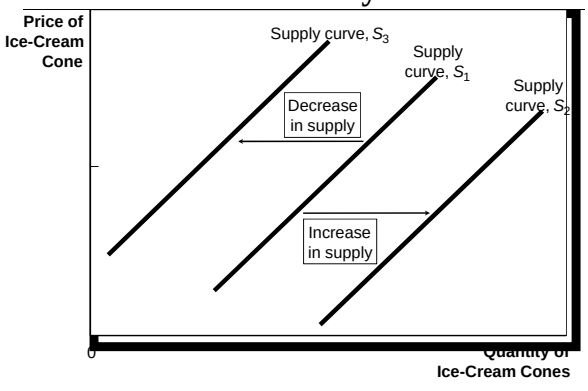

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Table 2: Variables That Influence Sellers Summary

Variable	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 Summary

- *Equilibrium* refers to a situation in which the price has reached the level where quantity supplied equals quantity demanded.

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SUPPLY AND DEMAND TOGETHER Summary

- *Equilibrium Price*
  - The price that balances quantity supplied and quantity demanded.
  - On a graph, it is the price at which the supply and demand curves intersect.
- *Equilibrium Quantity*
  - The quantity supplied and the quantity demanded at the equilibrium price.
  - On a graph it is the quantity at which the supply and demand curves intersect.

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SUPPLY AND DEMAND TOGETHER Summary

Demand Schedule

Price of Ice-Cream Cone	Market
$0.00	19
0.50	16
1.00	13
1.50	10
2.00	7
2.50	4
3.00	1

Supply Schedule

Price of Ice-Cream Cone	Market
$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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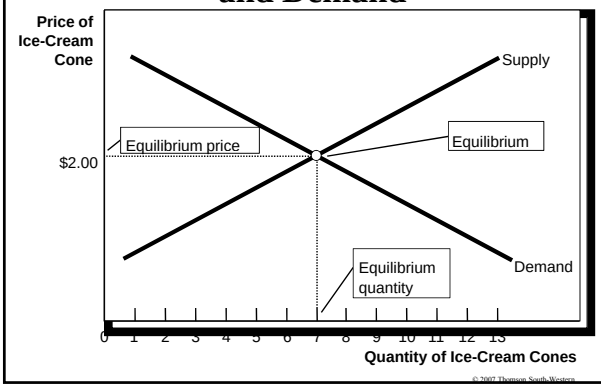
Figure 8 The Equilibrium of Supply and Demand Summary



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Equilibrium Summary

- *Surplus*
  - When price > equilibrium price, then quantity supplied > 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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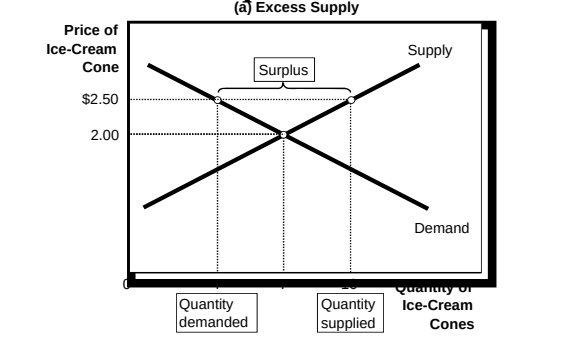
Figure 9 Markets Not in Equilibrium Summary



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Equilibrium Summary

- *Shortage*
  - When price < equilibrium price, then quantity demanded > 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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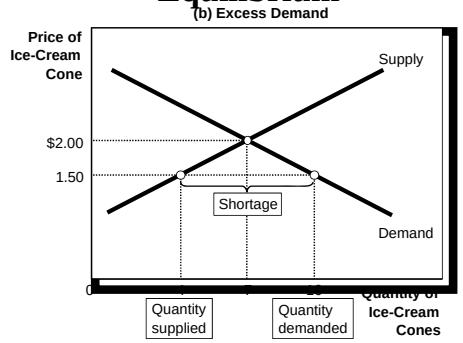
Figure 9 Markets Not in Equilibrium



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Summary

Equilibrium Summary

- *Law of supply and demand*
  - The claim that the price of any good adjusts to bring the quantity supplied and the quantity demanded for that good into balance.

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Table 3: Three Steps for Analyzing Changes in Equilibrium

1. Decide whether the event shifts the supply or demand curve (or perhaps both).
2. Decide in which direction the curve shifts.
3. Use the supply-and-demand diagram to see how the shift changes the equilibrium price and quantity.

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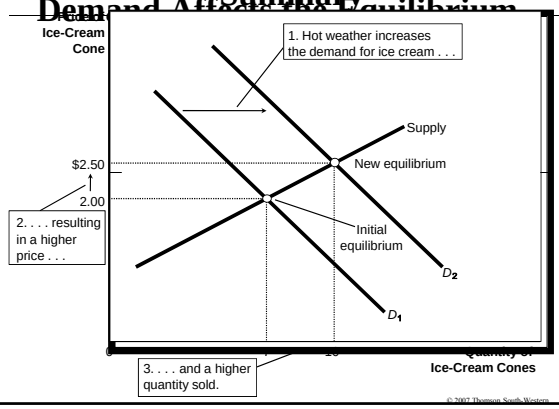
Summary

Figure 10 How an Increase in Demand Affects the Equilibrium



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Summary

Three Steps to Analyzing Changes in 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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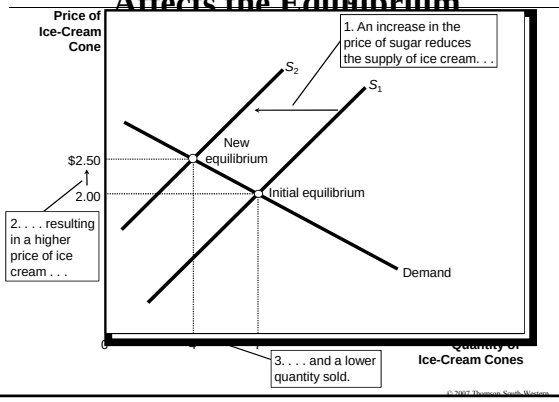
Summary

Figure 11 How a Decrease in Supply Affects the Equilibrium



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Summary

Table 4: What Happens to Price and Quantity When Supply or Demand

	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.
- In a competitive market, there are many buyers and sellers, each of whom has little or no influence on the market price.

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Summary

- The demand curve shows how the quantity of a good depends upon the price.
  - According to the law of demand, as the price of a good falls, the quantity demanded rises. Therefore, the demand curve slopes downward.
  - In addition to price, other determinants of how much consumers want to buy include income, the prices of complements and substitutes, tastes, expectations, and the number of buyers.
  - If one of these factors changes, the demand curve shifts.

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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. Therefore, the supply curve slopes upward.
  - In addition to price, other determinants of how much producers want to sell include input prices, technology, expectations, and the number of sellers.
  - If one of these factors changes, the supply curve shifts.

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Summary

- Market equilibrium is determined by the intersection of the supply and demand curves.
- At the equilibrium price, the quantity demanded equals the quantity supplied.
- The behavior of buyers and sellers naturally drives markets toward their equilibrium.

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Summary

- To analyze how any event influences a market, we use the supply-and-demand diagram to examine how the event affects the equilibrium price and quantity.
- In market economics, prices are the signals that guide economic decisions and thereby allocate resources.

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5

Elasticity and Its Application

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Elasticity Summary

- … allows us to analyze supply and demand with greater precision.
- … is a measure of how much buyers and sellers respond to changes in market conditions

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THE ELASTICITY OF DEMAND Summary

- The *price elasticity of demand* is a measure of how much the quantity demanded of a good responds to a change in the price of that good.
- When we talk about *elasticity*, that responsiveness is always measured in percentage terms.
- Specifically, the price elasticity of demand is the percentage change in quantity demanded due to a percentage change in the price.

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The Price Elasticity of Demand and Its Determinants Summary

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

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The Price Elasticity of Demand and Its Determinants Summary

- Demand tends to be more elastic:
  - the larger the number of close substitutes.
  - if the good is a luxury.
  - the more narrowly defined the market.
  - the longer the time period.

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Computing the Price Elasticity of Demand Summary

- 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

Summary

- 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:

$$\text{Price elasticity of demand} = \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in price}}$$

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

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The Midpoint Method: A Better Way to Calculate Percentage Changes and Elasticities

Summary

- The midpoint formula is preferable when calculating the price elasticity of demand because it gives the same answer regardless of the direction of the price 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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The Midpoint Method: A Better Way to Calculate Percentage Changes and Elasticities

Summary

- 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, using the midpoint formula, would be calculated as:

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

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The Variety of Demand Curves

Summary

- 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

Summary

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

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

Demand is price elastic.

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The Variety of Demand Curves

Summary

- 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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The Variety of Demand Curves Summary

- 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.
- But it is not the same thing as the slope!

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Figure 1 The Price Elasticity of Demand Summary

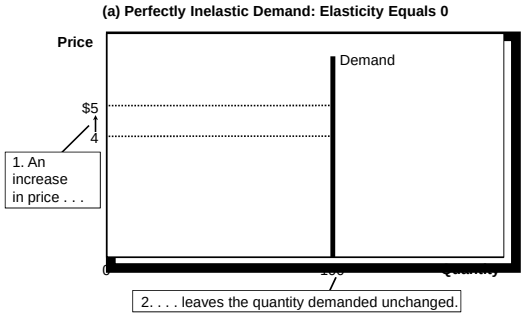

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Figure 1 The Price Elasticity of Demand Summary

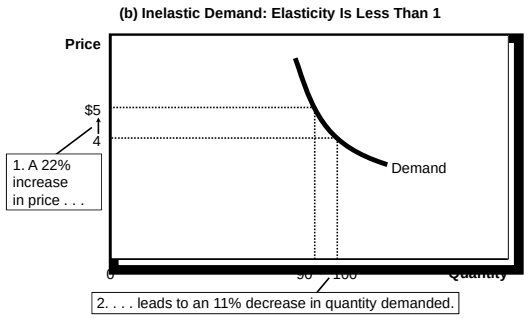

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Figure 1 The Price Elasticity of Demand Summary

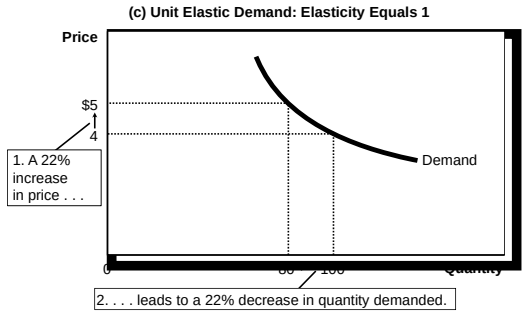

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Figure 1 The Price Elasticity of Demand Summary

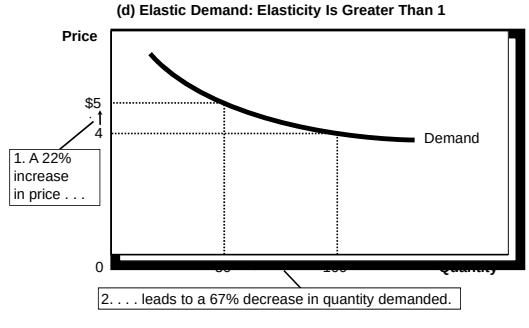

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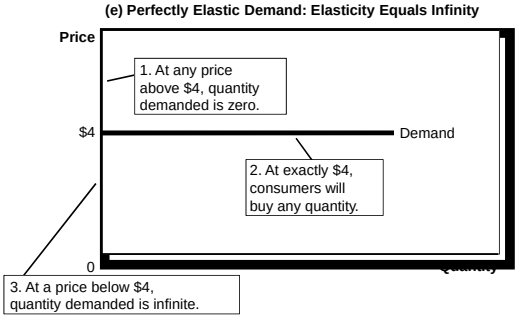
Figure 1 The Price Elasticity of Demand Summary



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Summary

Total Revenue and the Price Elasticity of Demand

- *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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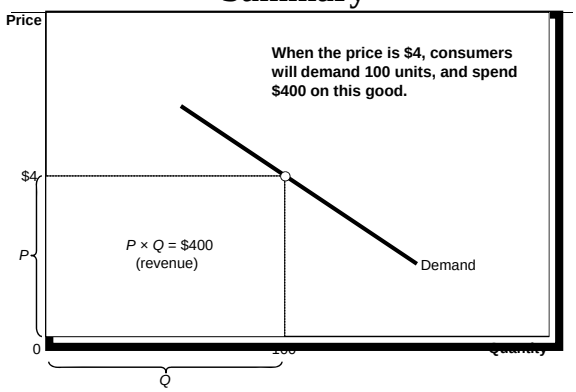
Summary

Figure 2 Total Revenue



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Summary

Elasticity and Total Revenue along a Linear Demand Curve

- 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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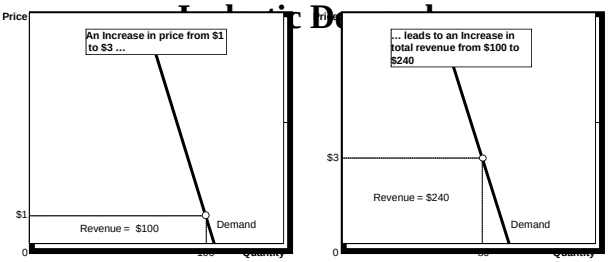
Summary

Figure 3 How Total Revenue Changes When Price Changes: Inelastic Demand



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Summary

Elasticity and Total Revenue along a Linear Demand Curve

- 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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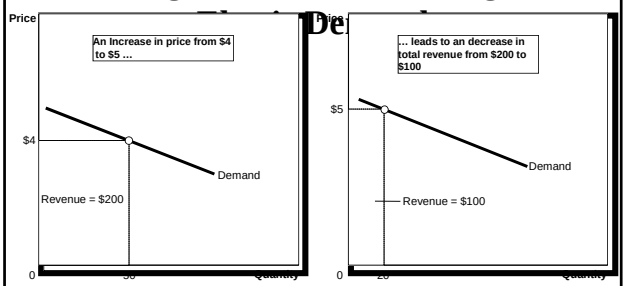
Summary

Figure 3 How Total Revenue Changes When Price Changes: Elastic Demand



Note that with each price increase, the Law of Demand still holds – an increase in price leads to a decrease in the quantity demanded. It is the change in TR that varies!

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Elasticity of a Linear Demand Curve Summary

Price	Quantity	Total Revenue (Price × Quantity)	Percent Change in Price	Percent Change in Quantity	Elasticity	Description
$7	0	$0	15	200	13.0	Elastic
6	2	12	18	67	3.7	Elastic
5	4	20	22	40	1.8	Elastic
4	6	24	29	29	1.0	Unit elastic
3	8	24	40	22	0.6	Inelastic
2	10	20	67	18	0.3	Inelastic
1	12	12	200	15	0.1	Inelastic
0	14	0				

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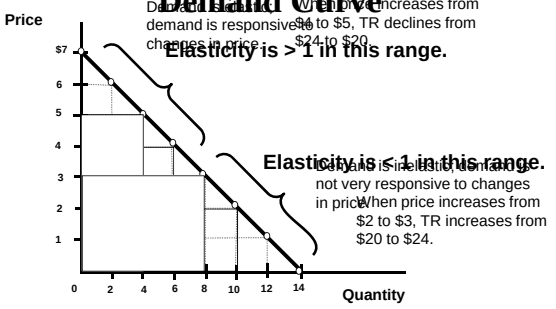
Figure 4 Elasticity of a Linear Demand Curve Summary



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Other Demand Elasticities Summary

- 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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Other Demand Elasticities Summary

- Computing Income Elasticity

$$\text{Income elasticity of demand} = \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in income}}$$

Remember, all elasticities are measured by dividing one percentage change by another

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Other Demand Elasticities Summary

- 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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Other Demand Elasticities Summary

- Income Elasticity
  - 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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Other Demand Elasticities

Summary

- *Cross-price elasticity of demand*
  - A measure of how much the quantity demanded of one good responds to a change in the price of another good, computed as the percentage change in quantity demanded of the first good divided by the percentage change in the price of the second good

$$\text{Cross-price elasticity of demand} = \frac{\%\text{change in quantity demanded of good 1}}{\%\text{change in price of good 2}}$$

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THE ELASTICITY OF SUPPLY

Summary

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

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Figure 5 The Price Elasticity of Supply

Summary

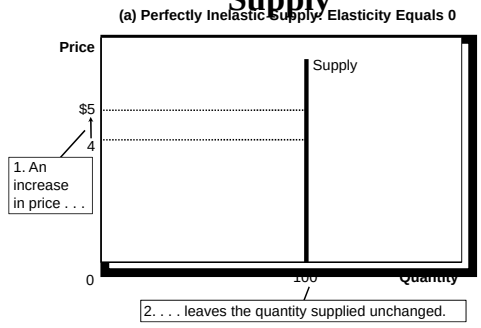

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Figure 5 The Price Elasticity of Supply

Summary

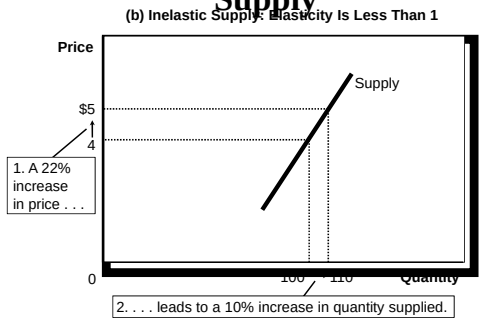

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Figure 5 The Price Elasticity of Supply

Summary

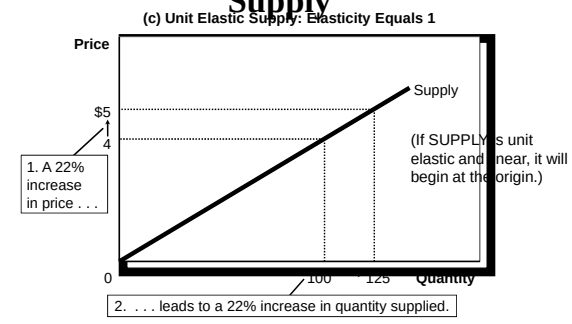

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Figure 5 The Price Elasticity of Supply

Summary

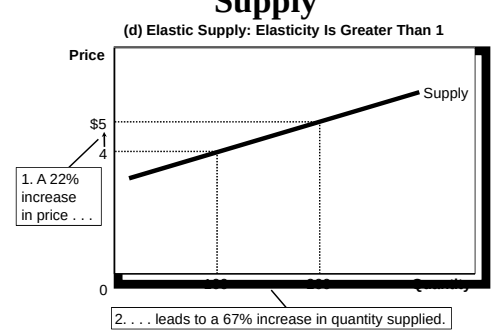

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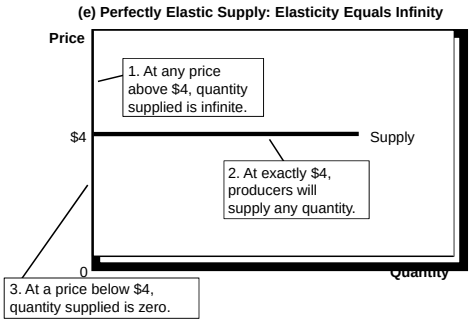
Figure 5 The Price Elasticity of Supply



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Summary

The Price Elasticity of Supply and Its Determinants

- 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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Summary

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.

$$\text{Price elasticity of supply} = \frac{\text{Percentage change in quantity supplied}}{\text{Percentage change in price}}$$

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Summary

THREE APPLICATIONS OF SUPPLY, DEMAND, AND 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 hybrid that is more productive than existing varieties?

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Summary

Can Good News for Farming Be Bad News for Farmers?

- 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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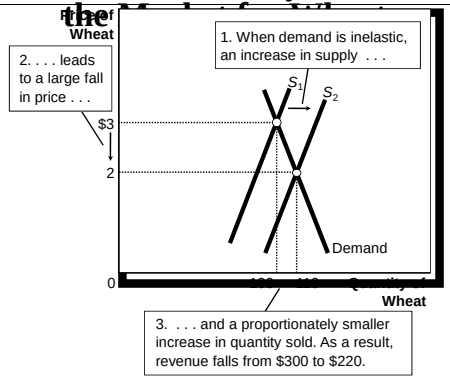
Summary

Figure 7 An Increase in Supply in the Market for Wheat



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Summary

Compute the Price Elasticity of Demand When There Is a Change in Supply

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

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

Demand is inelastic.

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Summary

Why Did OPEC Fail to Keep the Price of Oil High?

- Supply and Demand can behave differently in the short run and the long run
  - In the short run, both supply and demand for oil are relatively inelastic
  - But in the long run, both are elastic
    - Production outside of OPEC
    - More conservation by consumers

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Summary

Does Drug Interdiction Increase or Decrease Drug-Related Crime?

- Drug interdiction impacts sellers rather than buyers.
  - Demand is unchanged.
  - Equilibrium price rises although quantity falls.
- Drug education impacts the buyers rather than sellers.
  - Demand is shifted.
  - Equilibrium price and quantity are lowered.

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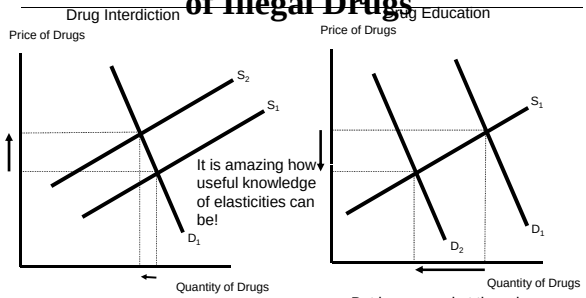
Summary

Figure 9 Policies to Reduce the Use of Illegal Drugs



It is amazing how useful knowledge of elasticities can be!

The debate over the war on drugs is one case where knowledge of price elasticity of demand is crucial. Interdiction shifts the supply, while education shifts the demand. The changes in quantities (and TR) are remarkable.

But in one market the price goes up.

And in the other it goes down.

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Summary

- Price elasticity of demand measures how much the quantity demanded responds to changes in the price.
- Price elasticity of demand is calculated as the percentage change in quantity demanded divided by the percentage change in 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 income elasticity of demand measures how much the quantity demanded responds to changes in consumers' income.
- The cross-price elasticity of demand measures how much the quantity demanded of one good responds to the price of another good.
- The price elasticity of supply measures how much the quantity supplied responds to changes in the price.

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Summary

- In most markets, supply is more elastic in the long run than in the short run.
- The price elasticity of supply is calculated as the percentage change in quantity supplied divided by the percentage change in price.
- The tools of supply and demand can be applied in many different types of markets.

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6

Supply, Demand, and Government Policies

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Supply, Demand, and Government Policies Summary

- 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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CONTROLS ON PRICES Summary

- 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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CONTROLS ON PRICES Summary

- *Price Ceiling*
  - A legal *maximum* on the price at which a good can be sold.
- *Price Floor*
  - A legal *minimum* on the price at which a good can be sold.

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How Price Ceilings Affect Market Outcomes Summary

- 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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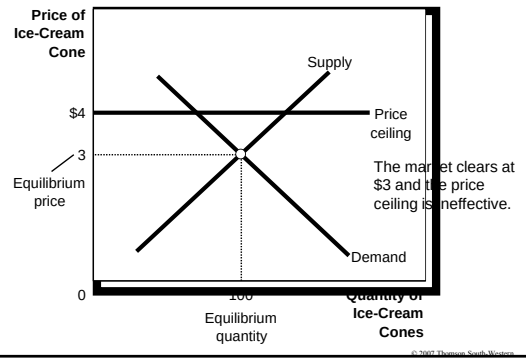
Figure 1 A Market with a Price Ceiling



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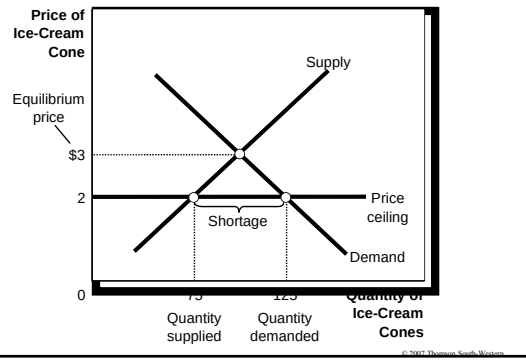
Summary



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How Price Ceilings Affect Market Outcomes

- 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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Summary

CASE STUDY: Lines at the Gas Pump

- In 1973, OPEC raised the price of crude oil in world markets. Crude oil is the major input in gasoline, so 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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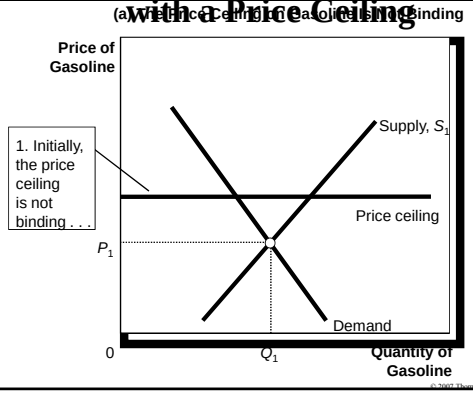
Summary

Figure 2 The Market for Gasoline with a Price Ceiling



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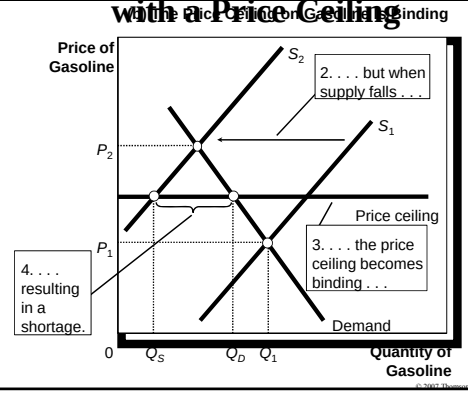
Summary

Figure 2 The Market for Gasoline with a Price Ceiling



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CASE STUDY: Rent Control in the Short Run and Long Run

Summary

- 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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Figure 3 Rent Control in the Short Run and in the Long Run

Summary

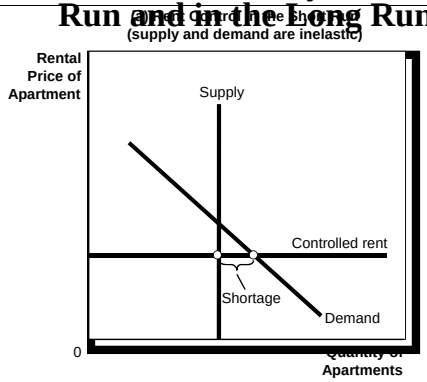

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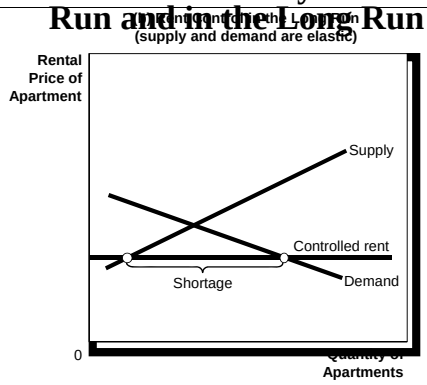
Figure 3 Rent Control in the Short Run and in the Long Run

Summary



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How Price Floors Affect Market Outcomes

Summary

- 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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Figure 4 A Market with a Price Floor

Summary

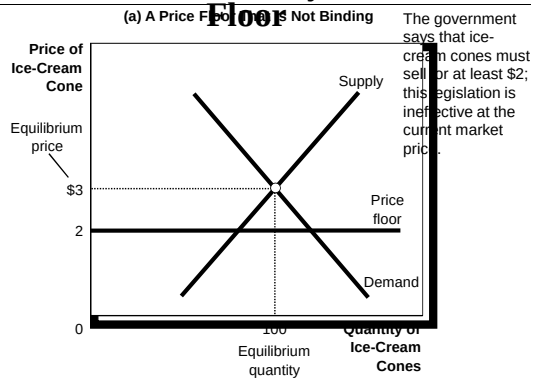

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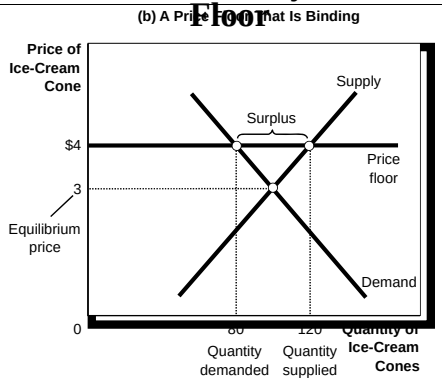
Figure 4 A Market with a Price Floor

Summary



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How Price Floors Affect Market Outcomes Summary

- 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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How Price Floors Affect Market Outcomes Summary

- 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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CASE STUDY: The Minimum Wage Summary

- 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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Figure 5 How the Minimum Wage Affects the Labor Market Summary

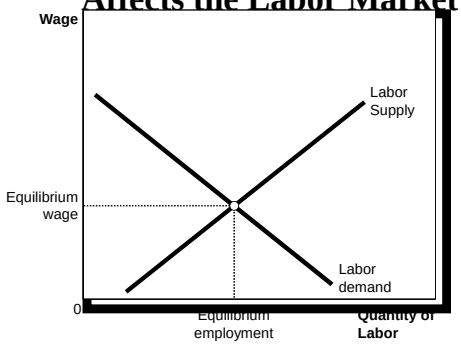

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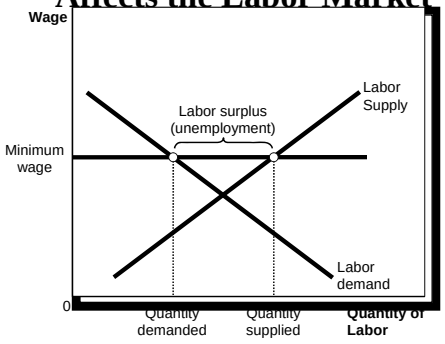
Figure 5 How the Minimum Wage Affects the Labor Market Summary



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TAXES Summary

- Governments levy taxes to raise revenue for public projects.

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How Taxes on Buyers (and Sellers) Affect Market Outcomes

Summary

- 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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How Taxes on Buyers Affect Market Outcomes

Summary

- Elasticity and tax incidence
  - *Tax incidence* is the manner in which the burden of a tax is shared among participants in a market.

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How Taxes on Buyers Affect Market Outcomes

Summary

- Elasticity and Tax Incidence
  - 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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Figure 6 A Tax on Buyers

Summary

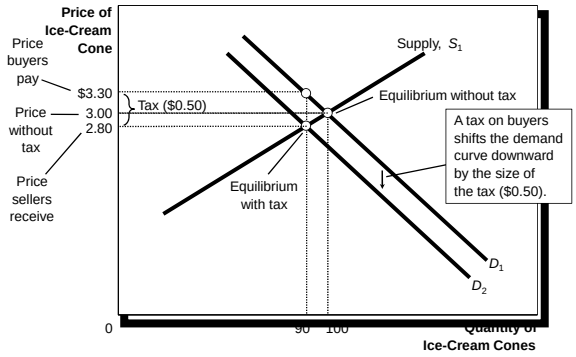

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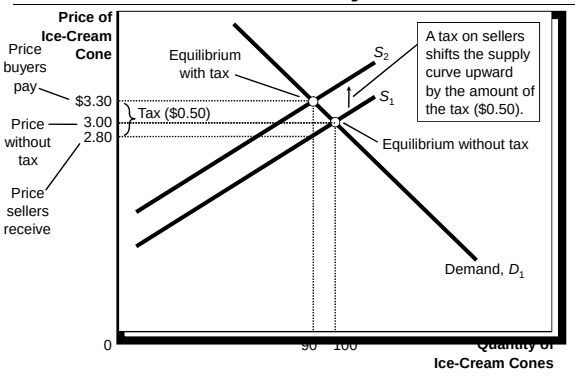
Figure 7 A Tax on Sellers

Summary



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Elasticity and Tax Incidence

Summary

- 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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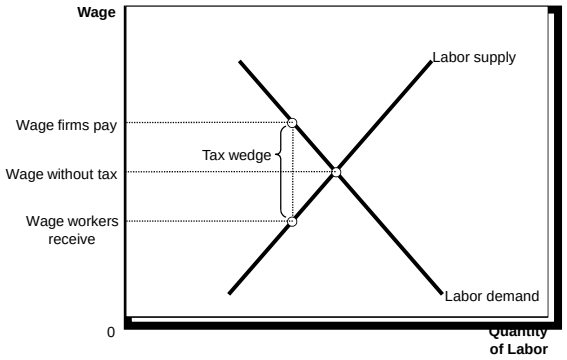
Figure 8 A Payroll Tax Summary



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Elasticity and Tax Incidence Summary

- 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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Figure 9 How the Burden of a Tax Is Divided Summary

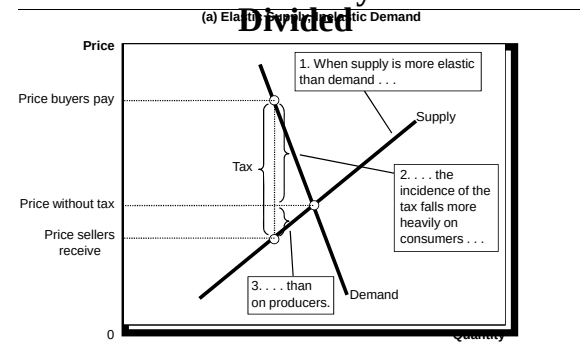

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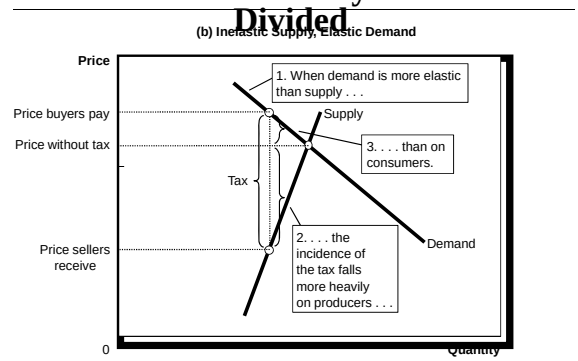
Figure 9 How the Burden of a Tax Is Divided Summary



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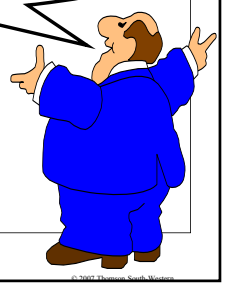
Elasticity and Tax Incidence Summary

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.
- The burden tends to fall on the side of the market that is less elastic.

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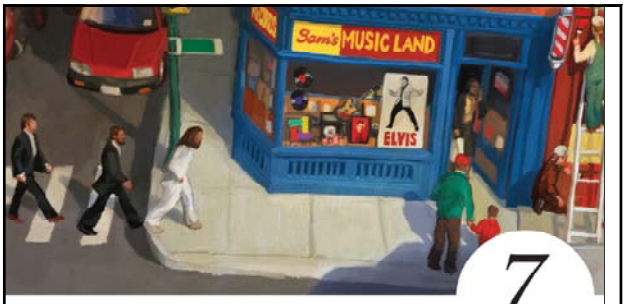

7

Consumers, Producers, and the Efficiency of Markets

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Consumers, Producers and the Efficiency of Markets Summary

- 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 can be addressed by welfare economics.

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Consumers, Producers and the Efficiency of Markets Summary

- 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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Consumers, Producers and the Efficiency of Markets Summary

- 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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Consumers, Producers and the Efficiency of Markets Summary

- 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 Summary

- *Willingness to pay* is the maximum amount that a buyer will pay for a good.
- It measures how much the buyer values the good or service.

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CONSUMER SURPLUS Summary

- *Consumer surplus* is the buyer's willingness to pay for a good minus the amount the buyer actually pays for it.

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Table 1: Four Possible Buyers' Willingness to Pay Summary

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

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Using the Demand Curve to Measure Consumer Surplus Summary

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

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The Demand Schedule and the Demand Curve Summary

Price	Buyers	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	John, Paul, George, Ringo	4

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Figure 1 The Demand Schedule and the Demand Curve

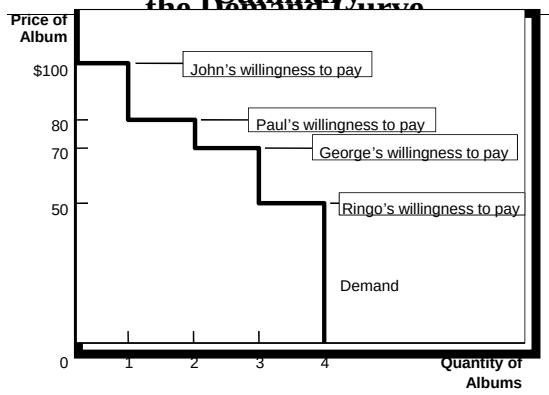

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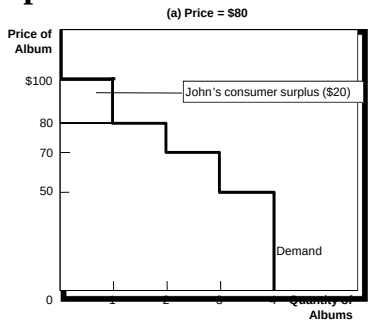
Figure 2 Measuring Consumer Surplus with the Demand Curve



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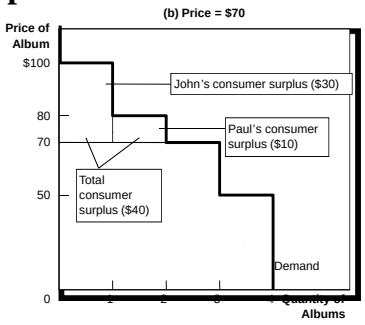

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Using the Demand Curve to Measure Consumer Surplus

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

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Figure 3 How the Price Affects Consumer Surplus

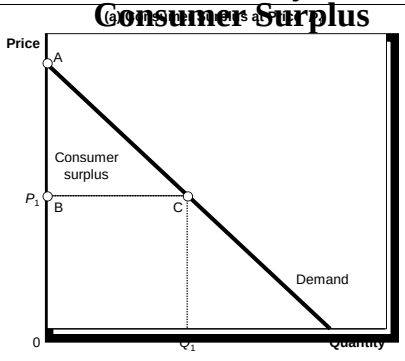

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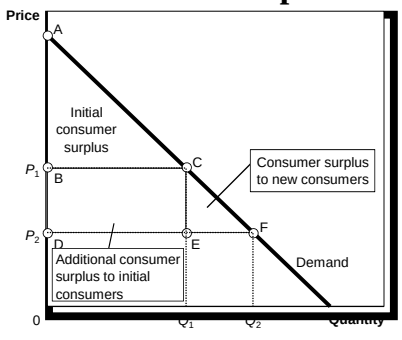
Figure 3 How the Price Affects Consumer Surplus



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What Does Consumer Surplus Measure?

- 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 for a good minus the seller's *cost*.
- It measures the benefit to sellers participating in a market.

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Table 2: The Costs of Four Possible Sellers

Seller	Cost
Mary	$900
Frida	800
Georgia	600
Grandma	500

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Using the Supply Curve to Measure Producer Surplus

- Just as consumer surplus is related to the demand curve, producer surplus is closely related to the supply curve.

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The Supply Schedule and the Supply

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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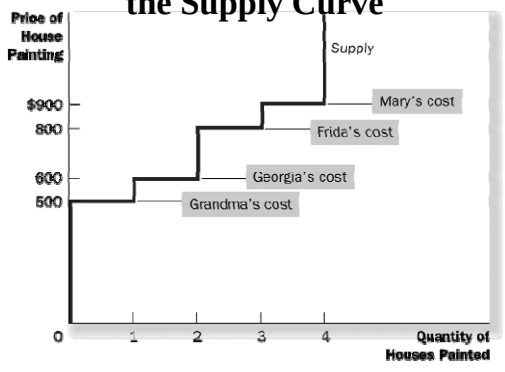
Figure 4 The Supply Schedule and the Supply Curve



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Using the Supply Curve to Measure Producer Surplus

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

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Figure 5 Measuring Producer Surplus with the Supply Curve

(a) Price = $800

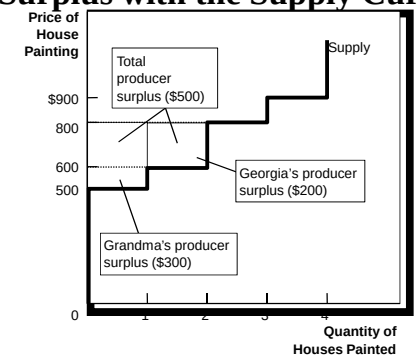

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Figure 5 Measuring Producer Surplus with the Supply Curve

(b) Price = $600

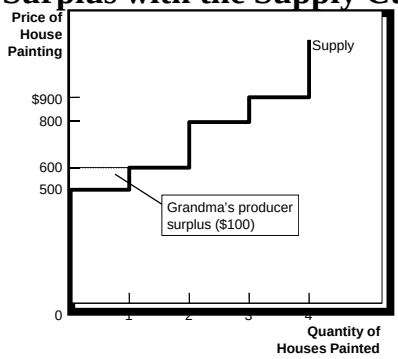

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Figure 6 How the Price Affects Producer Surplus

(a) Producer Surplus at Price P_1

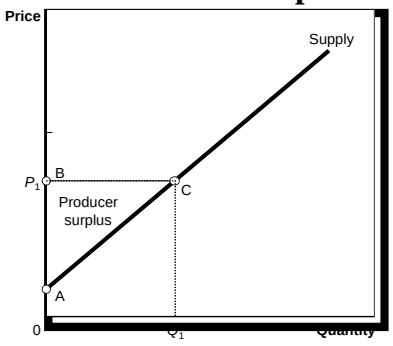

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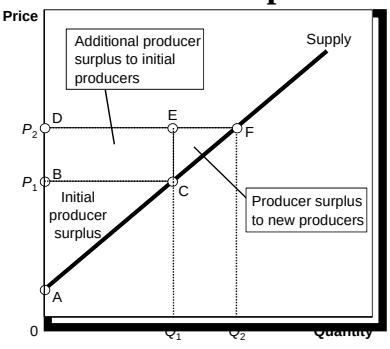
Figure 6 How the Price Affects Producer Surplus

(b) Producer Surplus at Price P_2



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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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The Benevolent Social Planner Summary

Consumer Surplus
= Value to buyers – Amount paid by buyers

and

Producer Surplus
= Amount received by sellers – Cost to sellers

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The Benevolent Social Planner Summary

Total surplus
= Consumer surplus + Producer surplus

or

Total surplus
= Value to buyers – Cost to sellers

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The Benevolent Social Planner Summary

- *Efficiency* is the property of a resource allocation of maximizing the total surplus received by all members of society.

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The Benevolent Social Planner Summary

- 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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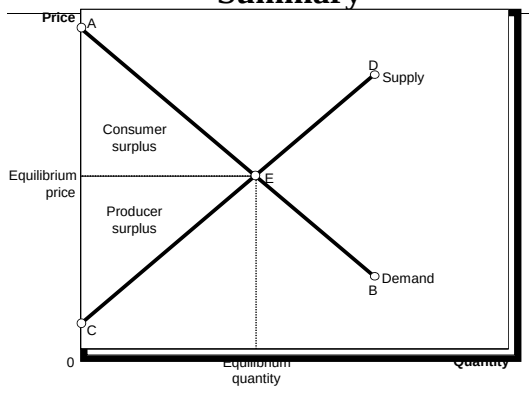
Figure 7 Consumer and Producer Surplus in the Market Equilibrium

Summary



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Evaluating the Market Equilibrium Summary

- Three Insights Concerning Market Outcomes
  - Free markets allocate the supply of goods to the buyers who value them most highly, as measured by their willingness to pay.
  - 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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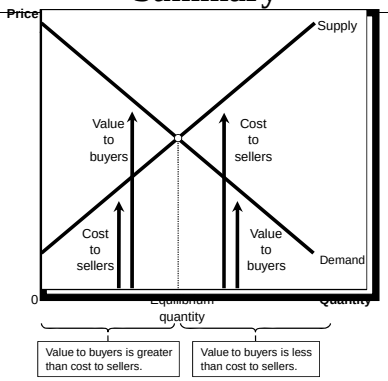
Figure 8 The Efficiency of the Summary



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Evaluating the Market Equilibrium Summary

- 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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Evaluating the Market Equilibrium Summary

- 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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Evaluating the Market Equilibrium Summary

- Externalities
  - created when a market outcome affects individuals other than buyers and sellers in that market.
  - 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 equals buyers' willingness to pay for a good minus the amount they actually pay for it.
- 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 equals the amount sellers receive for their goods minus their costs of production.
- 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

- 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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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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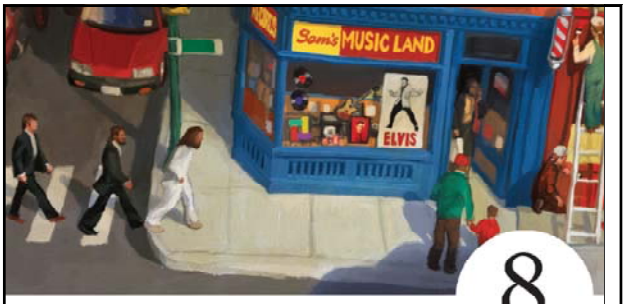

8

Application: The Costs of Taxation

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Application: The Costs of Taxation Summary

- 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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Summary THE DEADWEIGHT LOSS OF TAXATION

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

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THE DEADWEIGHT LOSS OF TAXATION Summary

- 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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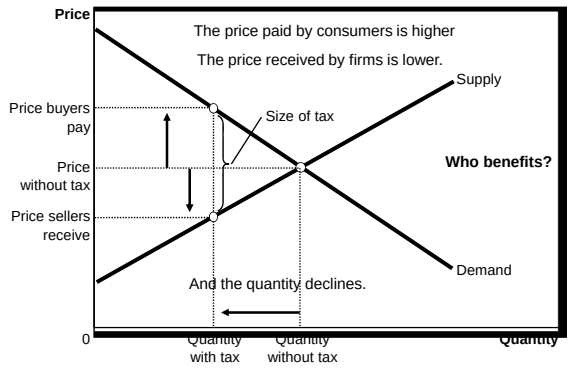
Figure 1 The Effects of a Tax



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How a Tax Affects Market Participants

- 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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How a Tax Affects Market Participants

- 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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Figure 2 Tax Revenue

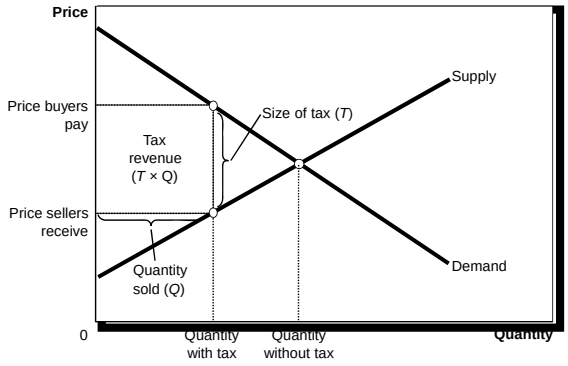

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Figure 3 How a Tax Effects Welfare

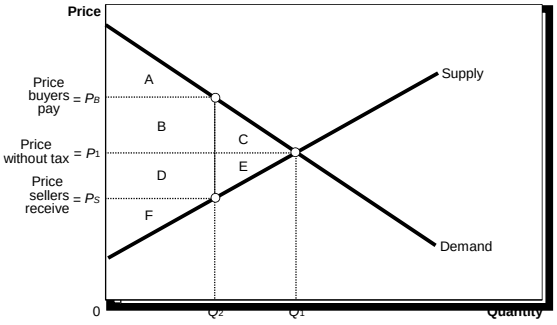

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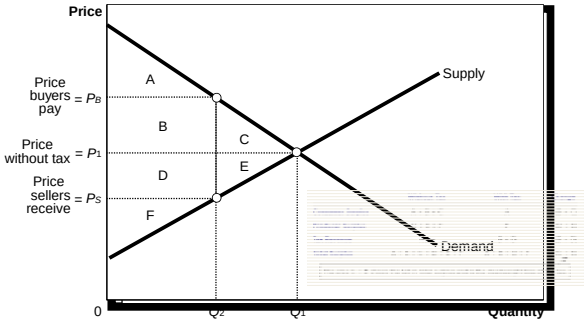
Figure 3 How a Tax Effects Welfare



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How a Tax Affects Market Participants Summary

- Changes in Welfare
  - A *deadweight loss* is the fall in total surplus that results from a market distortion, such as a tax.

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How a Tax Affects Market Participants Summary

- The change in total welfare includes:
  - The change in consumer surplus,
  - The change in producer surplus, and
  - 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 Summary

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

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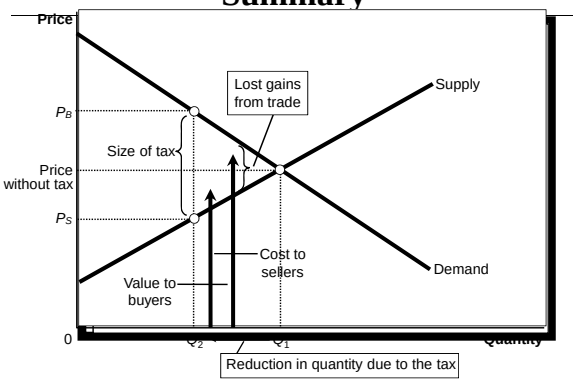
Figure 4 The Deadweight Loss Summary



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THE DETERMINANTS OF THE DEADWEIGHT LOSS Summary

- 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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Figure 5 Tax Distortions and Elasticities Summary

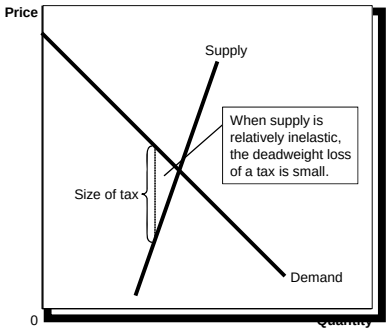

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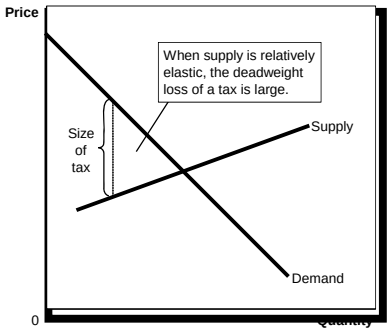
Figure 5 Tax Distortions and Elasticities



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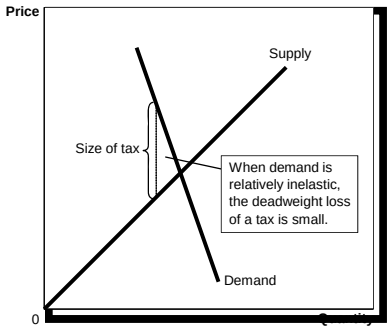
Summary

Inelastic Supply

Figure 5 Tax Distortions and Elasticities



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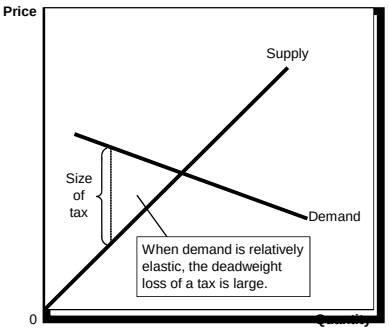
Summary

Elastic Demand

Figure 5 Tax Distortions and Elasticities



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Summary

Inelastic Supply

THE DETERMINANTS OF THE 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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Summary

Elastic Demand

DEADWEIGHT LOSS AND TAX REVENUE AS TAXES VARY

- The Deadweight Loss Debate
  - Some economists argue that labor taxes are highly distorting and believe that labor supply is more elastic.
  - 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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Summary

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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Figure 6 How Deadweight Loss and Tax Revenue Vary with the Size of Summarys

(a) Small Tax

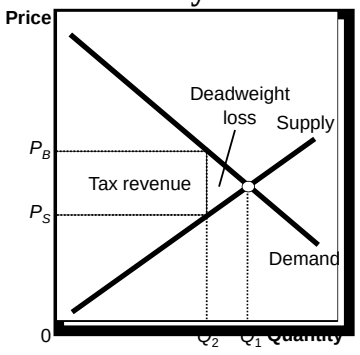

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Figure 6 How Deadweight Loss and Tax Revenue Vary with the Size of Summarys

(b) Medium Tax

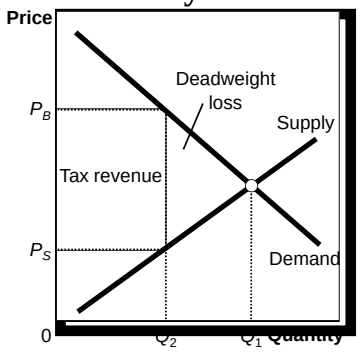

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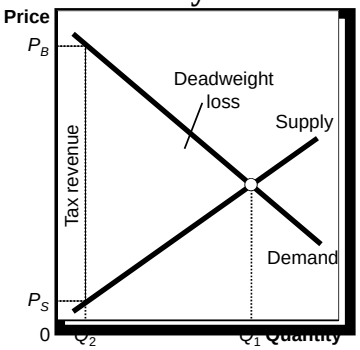
Figure 6 How Deadweight Loss and Tax Revenue Vary with the Size of Summarys

(c) Large Tax



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DEADWEIGHT LOSS AND TAX REVENUE AS TAXES VARY Summary

- 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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Figure 6 How Deadweight Loss and Tax Revenue Vary with the Size of a Tax Summarys

(a) Deadweight Loss

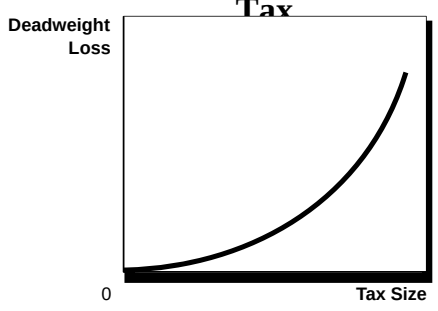

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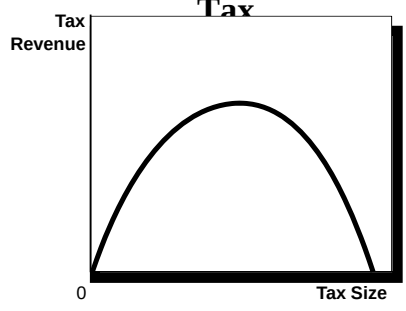
Figure 6 How Deadweight Loss and Tax Revenue Vary with the Size of a Tax Summarys

(b) Revenue (the Laffer curve)



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DEADWEIGHT LOSS AND TAX REVENUE AS TAXES VARY

Summary

- 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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CASE STUDY: The Laffer Curve and Supply-side Economics

Summary

- 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.
- 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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Application: International Trade

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Applications: International Trade Summary

- What determines whether a country imports or exports a good?

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Applications: International Trade Summary

- Who gains and who loses from free trade among countries?

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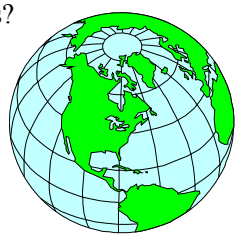
Applications: International Trade Summary

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



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THE DETERMINANTS OF TRADE Summary

- 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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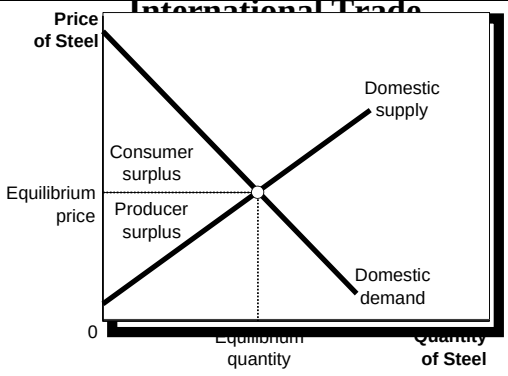
Figure 1 The Equilibrium without International Trade Summary



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The Equilibrium Without Trade Summary

- 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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The World Price and Comparative Advantage Summary

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

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The World Price and Comparative Advantage Summary

- 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 price that prevails in the world market for that good.

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The World Price and Comparative Advantage Summary

- 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.
- 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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Figure 2 International Trade in an Exporting Country Summary

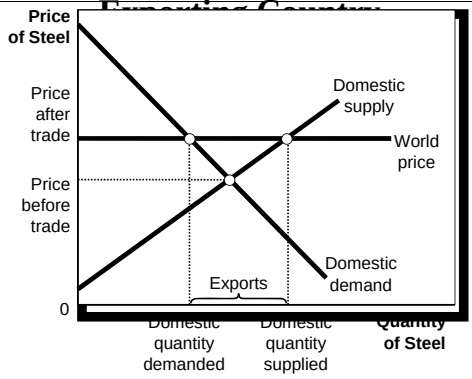

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Figure 2 International Trade in an Exporting Country Summary

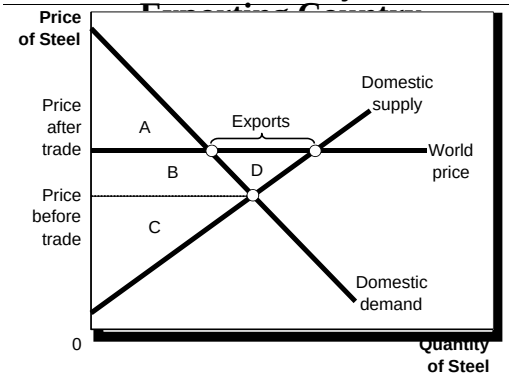

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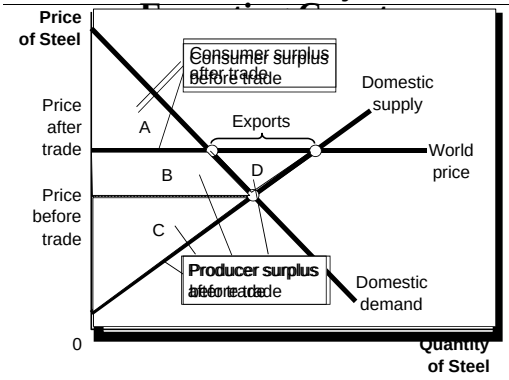
Figure 2 International Trade in an Exporting Country Summary



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How Free Trade Affects Welfare in 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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Summary

THE WINNERS AND LOSERS FROM TRADE

- 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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The Gains and Losses of an Importing Country

- International Trade in an 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.
    - domestic consumers will want to buy steel at the lower world price.
    - domestic producers of steel will have to lower their output because the domestic price moves to the world price.

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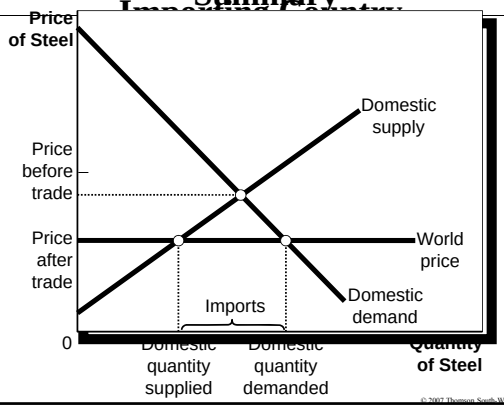
Summary

Figure 3 International Trade in an Importing Country



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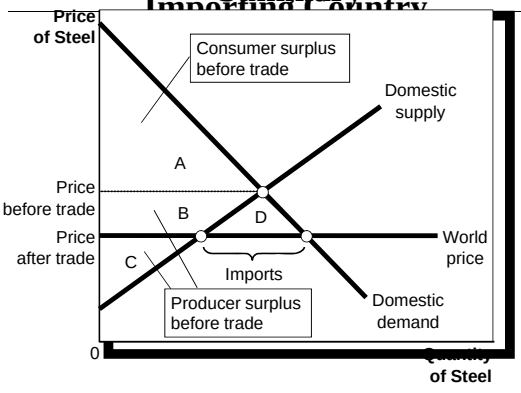
Summary

Figure 3 International Trade in an Importing Country



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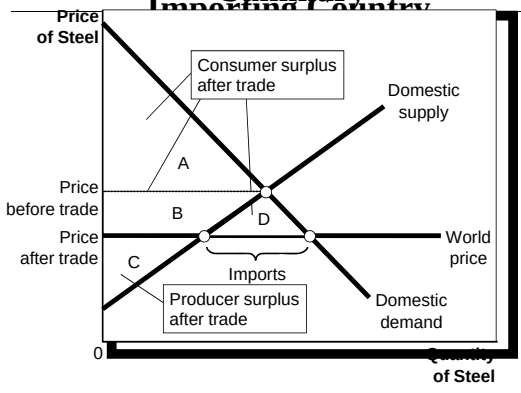
Summary

Figure 3 International Trade in an Importing Country



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How Free Trade Affects Welfare in an Importing Country Summary

	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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The Gains and Losses of an Importing Country Summary

- 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 WINNERS AND LOSERS FROM TRADE Summary

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

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The Effects of a Tariff Summary

- A *tariff* is a tax on goods produced abroad and sold domestically.
- Tariffs raise the price of imported goods above the world price by the amount of the tariff.

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Figure 4 The Effects of a Tariff Summary

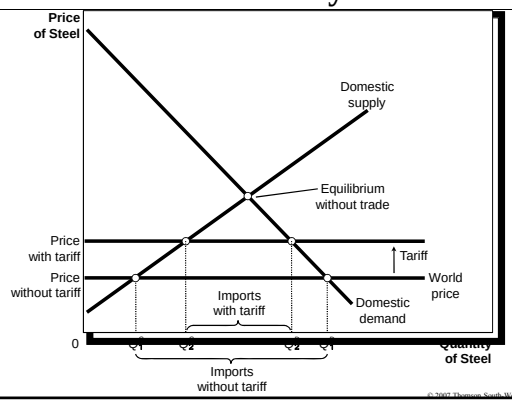

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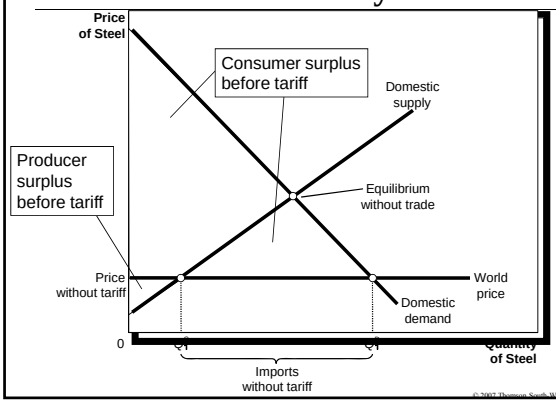
Figure 4 The Effects of a Tariff Summary



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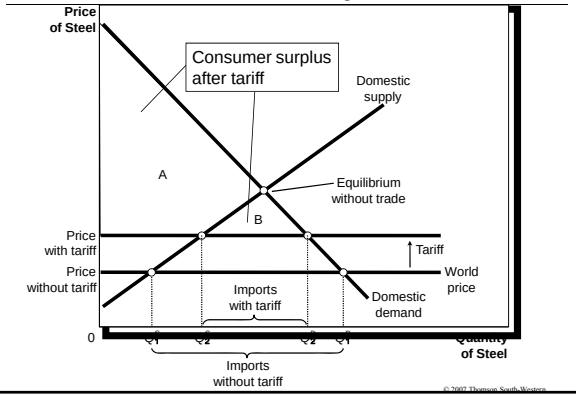

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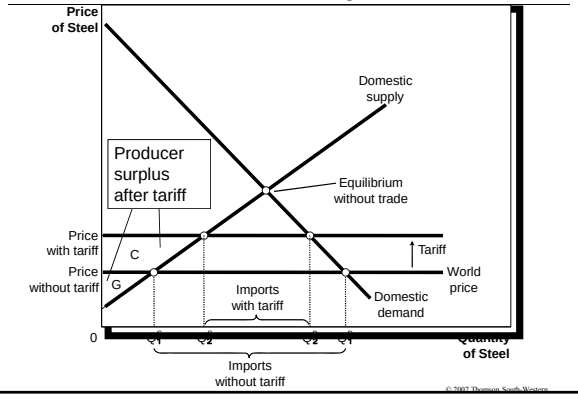

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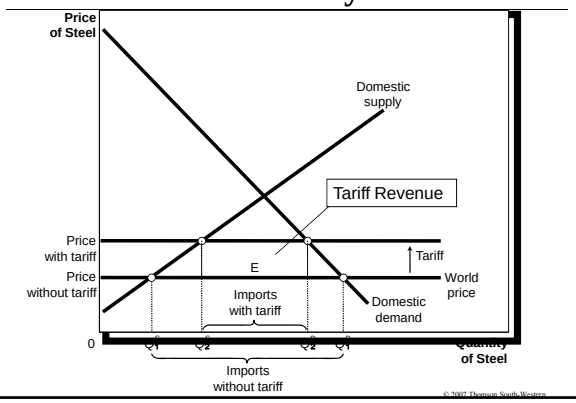

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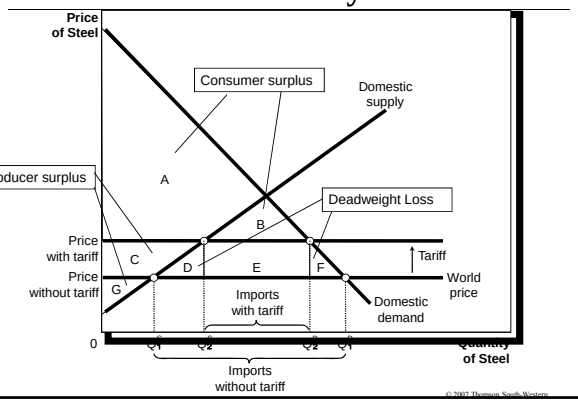

The Effects of a Tariff Summary

	Before Trade	After Trade	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.

The Effects of a Tariff Summary

- 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.

FYI: Import Quotas: Another Way to Restrict Trade

Summary

- The Effects of an Import Quota
  - An import quota is a limit on the quantity of a good that can be produced abroad and sold domestically.
  - 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 higher domestic price.

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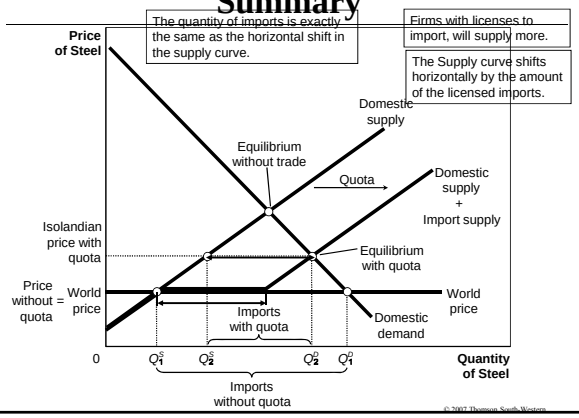
The Effects of an Import Quota

Summary



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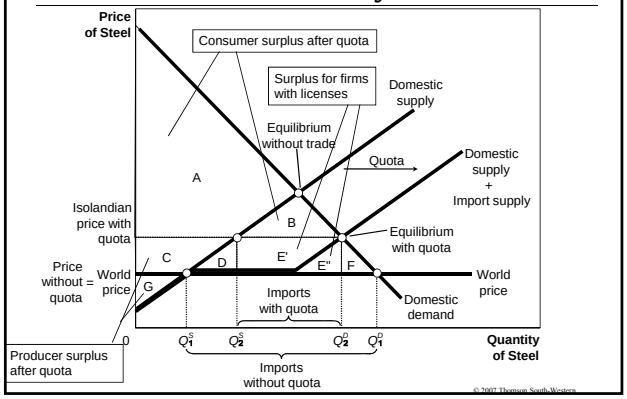
The Effects of an Import Quota

Summary



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The Effects of an Import Quota

Summary

	Before Quota	After Quota	Change
Consumer Surplus	A + B + C + D + E' + E'' + F	A + B	−(C + D + E' + E'' + F)
Producer Surplus	G	C + G	+C
License-Holder Surplus	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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FYI: Import Quotas: Another Way to Restrict Trade

Summary

- 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 Lessons for Trade Policy

Summary

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

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The Lessons for Trade Policy
Summary

- 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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The Lessons for Trade Policy
Summary

- 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
Summary

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

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CASE STUDY: Trade Agreements and the World Trade Organization
Summary

- 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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CASE STUDY: Trade Agreements and the World Trade Organization
Summary

- 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 United States, Mexico, and Canada.

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CASE STUDY: Trade Agreements and the World Trade Organization
Summary

- 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 percent after WWII to about 5 percent 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 that 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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10

Externalities

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When the market works as it should…

Summary

- Recall: 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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EXTERNALITIES AND MARKET INEFFICIENCY
Summary

- An *externality* refers to the uncompensated impact of one person's actions on the well-being of a bystander.
- Externalities cause markets to be inefficient, and thus fail to maximize total surplus.

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EXTERNALITIES AND MARKET INEFFICIENCY
Summary

- 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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EXTERNALITIES AND MARKET INEFFICIENCY
Summary

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

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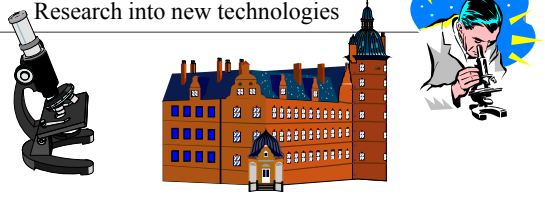
EXTERNALITIES AND MARKET INEFFICIENCY
Summary

- Positive Externalities
  - Immunizations
  - Restored historic buildings
  - Research into new technologies



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EXTERNALITIES AND MARKET INEFFICIENCY
Summary

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

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Welfare Economics: A Recap
Summary

- The Market for Aluminum
  - The quantity produced and consumed in the market equilibrium is efficient in the sense that it maximizes the sum of producer and consumer surplus.
  - 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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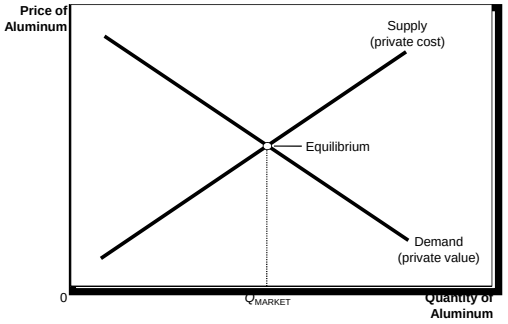
Figure 1 The Market for Aluminum



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Summary

Welfare Economics: A Recap

- The Market for Aluminum
  - 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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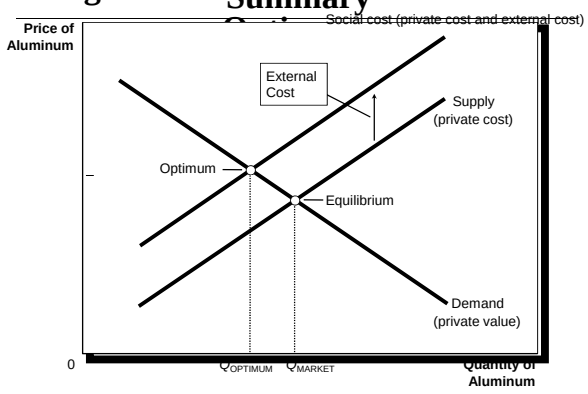
Summary

Figure 2 Pollution and the Social Optimum



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Summary

Negative Externalities

- 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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Summary

Negative Externalities

- *Internalizing an externality* involves altering incentives so that people take account of the external effects of their actions.
- To achieve 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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Summary

Positive Externalities

- When an externality benefits the bystanders, a positive externality exists.
  - The social value of the good exceeds the private value.
- 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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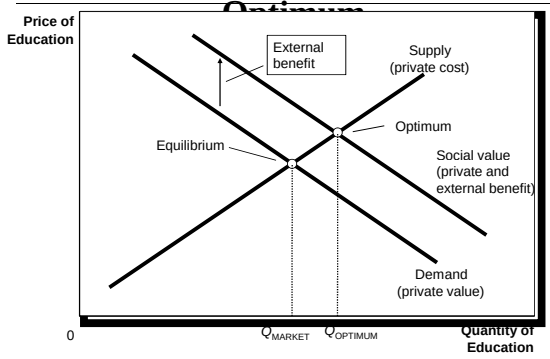
Figure 3 Education and the Social Optimum



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Positive Externalities Summary

- The intersection of the supply curve and the social-value 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 value of the good exceeds the private value of the good.

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Positive Externalities Summary

- Internalizing Externalities:
  - Subsidies
    - Used as the primary method for attempting to internalize positive externalities.
  - Industrial Policy
    - Government intervention in the economy that aims to promote technology-enhancing industries
      - 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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PRIVATE SOLUTIONS TO EXTERNALITIES Summary

- Government action is not always needed to solve the problem of externalities.
- Types of Private Solutions
  - Moral codes and social sanctions
  - Charitable organizations
  - Integrating different types of businesses
  - Contracting between parties

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The Coase Theorem Summary

- The *Coase theorem* is a proposition that if private parties can bargain without cost over the allocation of resources, they can solve the problem of externalities on their own.
- Transaction 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 Summary

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

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PUBLIC POLICIES TOWARD EXTERNALITIES Summary

- 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: Regulation Summary

- 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 Policy 1: Corrective Taxes and Subsidies Summary

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

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Market-Based Policy 1: Corrective Taxes and Subsidies Summary

- Examples of Regulation versus Corrective 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. corrective tax).

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Market-Based Policy 2: Tradable Pollution Permits Summary

- 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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Figure 4 The Equivalence of Corrective Taxes and Pollution Summary

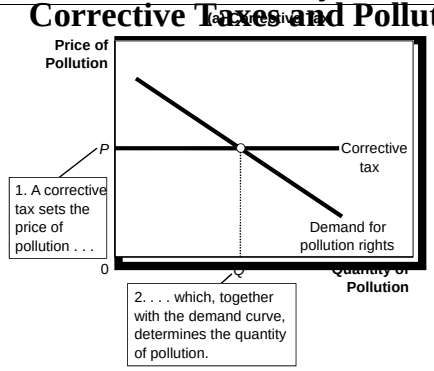

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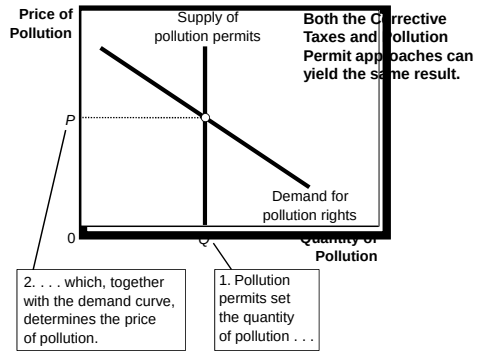
Figure 4 The Equivalence of Corrective Taxes and Pollution



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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 corrective taxes or by issuing pollution permits.

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The Costs of Production

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The Costs of Production Summary

- 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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WHAT ARE COSTS? Summary

- According to 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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WHAT ARE COSTS? Summary

- The Firm's Objective
  - The economic goal of the firm is to maximize profits.

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Total Revenue, Total Cost, and Profit Summary

- *Total Revenue*
  - The amount a firm receives for the sale of its output.
- *Total Cost*
  - The market value of the inputs a firm uses in production.

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Total Revenue, Total Cost, and Profit Summary

- *Profit* is the firm's total revenue minus its total cost.
- Profit = Total revenue - Total cost

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Costs as Opportunity Costs Summary

- A firm's cost of production includes all the opportunity costs of making its output of goods and services.
- Explicit and Implicit Costs
  - A firm's cost of production include *explicit costs* and *implicit costs.*
    - Explicit costs are input costs that require a direct outlay of money by the firm.
    - Implicit costs are input costs that do not require an outlay of money by the firm.

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Economic Profit versus Accounting Profit Summary

- Economists measure a firm's *economic profit* as total revenue minus total cost, including both explicit and implicit costs.
- Accountants measure the *accounting profit* as the firm's total revenue minus only the firm's explicit costs.

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Economic Profit versus Accounting Profit

Summary

- 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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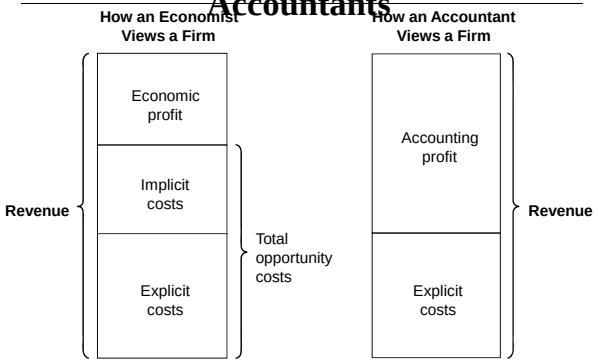
Figure 1 Economists versus Accountants

Summary



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PRODUCTION AND COSTS

Summary

- 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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The Production Function

Summary

- Marginal Product
  - The *marginal product* of any input in the production process is the increase in output that arises from an additional unit of that input.

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Table 1 A Production Function and Total Cost: Hungry Helen's Cookie

Summary

Number of Workers	Output (quantity of cookies produced per hour)	Marginal Product of Labor	Cost of Factory	Cost of Workers	Total Cost of Inputs (cost of factory + cost of workers)
0	0		$30	$0	$30
		50			
1	50		30	10	40
		40			
2	90		30	20	50
		30			
3	120		30	30	60
		20			
4	140		30	40	70
		10			
5	150		30	50	80
		5			
6	155		30	60	90

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The Production Function

Summary

- *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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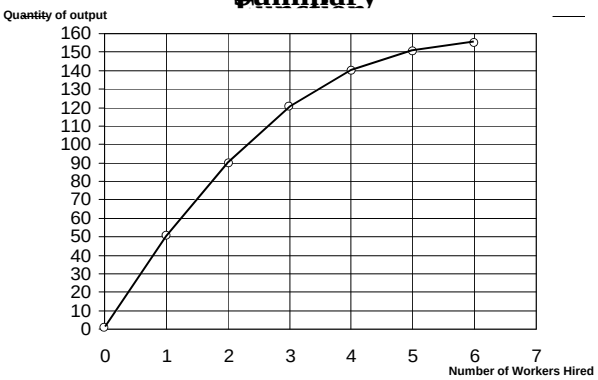
Figure 2 Hungry Helen's Production Function



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Summary

The Production Function

- 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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Summary

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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Summary

Table 1 A Production Function and Total Cost: Hungry Helen's Cookie

Number of Workers	Output (quantity of cookies produced per hour)	Marginal Product of Labor	Cost of Factory	Cost of Workers	Total Cost of Inputs (cost of factory + cost of workers)
0	0		$30	$0	$30
		50			
1	50		30	10	40
		40			
2	90		30	20	50
		30			
3	120		30	30	60
		20			
4	140		30	40	70
		10			
5	150		30	50	80
		5			
6	155		30	60	90

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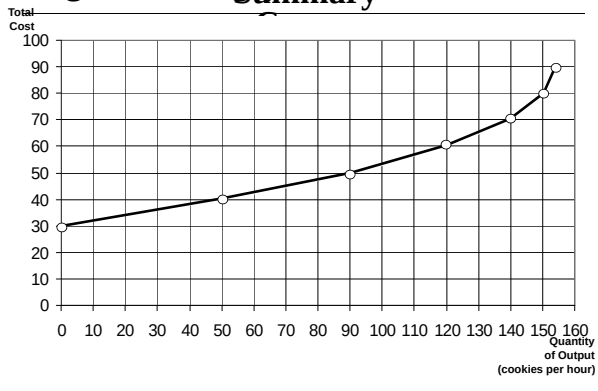
Figure 2 Hungry Helen's Total-Cost Curve



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Summary

THE VARIOUS MEASURES OF COST

- Costs of production may be divided into *fixed costs* 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 vary* with the quantity of output produced.

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Fixed and Variable Costs Summary

- Total Costs
  - Total Fixed Costs (TFC)
  - Total Variable Costs (TVC)
  - Total Costs (TC)
  - *TC = TFC + TVC*

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Summary

Table 2 The Various Measures of Cost: Thirsty Thelma's Lemonade

Quantity of Lemonade (Glasses per hour)	Total Cost	Fixed Cost	Variable Cost	Average Fixed Cost	Average Variable Cost	Average Total Cost	Marginal Cost
0	$ 3.00	$3.00	$ 0.00	—	—	—	
							$0.30
1	3.30	3.00	0.30	$3.00	$0.30	$3.30	
							0.50
2	3.80	3.00	0.80	1.50	0.40	1.90	
							0.70
3	4.50	3.00	1.50	1.00	0.50	1.50	
							0.90
4	5.40	3.00	2.40	0.75	0.60	1.35	
							1.10
5	6.50	3.00	3.50	0.60	0.70	1.30	
							1.30
6	7.80	3.00	4.80	0.50	0.80	1.30	
							1.50
7	9.30	3.00	6.30	0.43	0.90	1.33	
							1.70
8	11.00	3.00	8.00	0.38	1.00	1.38	
							1.90
9	12.90	3.00	9.90	0.33	1.10	1.43	
							2.10
10	15.00	3.00	12.00	0.30	1.20	1.50	

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Fixed and Variable Costs Summary

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

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Fixed and Variable Costs Summary

- Average Costs
  - *Average Fixed Costs* (AFC)
  - *Average Variable Costs* (AVC)
  - *Average Total Costs* (ATC)
  - *ATC = AFC + AVC*

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Average and Marginal Costs Summary

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

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

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

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Average and Marginal Costs Summary

- Marginal Cost
  - *Marginal cost* (MC) measures the increase in total cost that arises from an extra unit of production.
  - Marginal cost helps answer the following question:
    - How much does it cost to produce an additional unit of output?

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Average and Marginal Cost Summary

$$MC = \frac{(\text{change in total cost})}{(\text{change in quantity})} = \frac{\Delta TC}{\Delta Q}$$

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Thirsty Thelma's Lemonade Stand Summary

Note how Marginal Cost changes with each change in Quantity.

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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Figure 3 Thirsty Thelma's Total-Cost Curve Summary

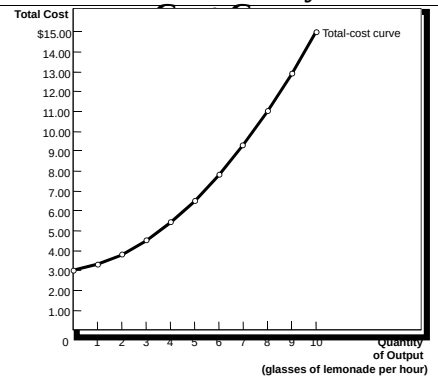

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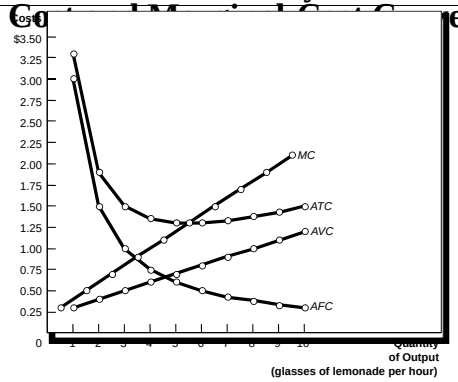
Figure 4 Thirsty Thelma's Average-Cost and Marginal-Cost Curves Summary



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Cost Curves and Their Shapes Summary

- 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 Summary

- 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 Summary

- The bottom of the U-shaped ATC curve 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 Summary

- 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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Cost Curves and Their Shapes Summary

- 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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Typical Cost Curves Summary

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

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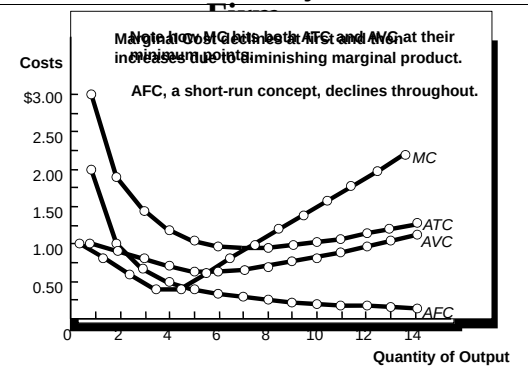
Figure 5 Cost Curves for a Typical Firm Summary



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Typical Cost Curves Summary

- 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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Summary

COSTS IN THE SHORT RUN AND 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, *all* fixed costs become variable costs.
- 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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Summary

Economies and Diseconomies of Scale

- *Economies of scale* refer to the property whereby long-run average total cost falls as the quantity of output increases.
- *Diseconomies of scale* refer to the property whereby long-run average total cost rises as the quantity of output increases.
- *Constant returns to scale* refers to the property whereby long-run average total cost stays the same as the quantity of output increases.

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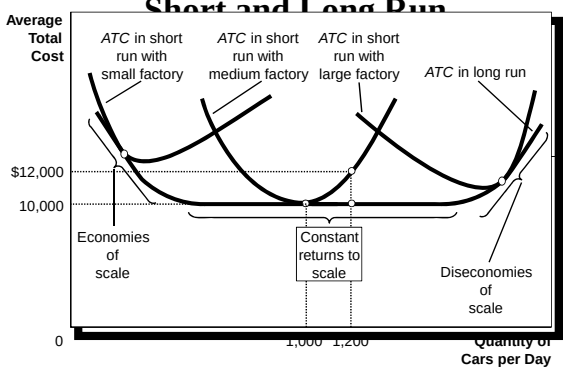
Summary

Figure 6 Average Total Cost in the Short and Long Run



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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 do not change when the firm alters the quantity of output produced; variable costs do change as the firm alters quantity of output produced.

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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.
- Average cost first falls as output increases and then rises.

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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.
- In particular, many costs are fixed in the short run but variable in the long run.

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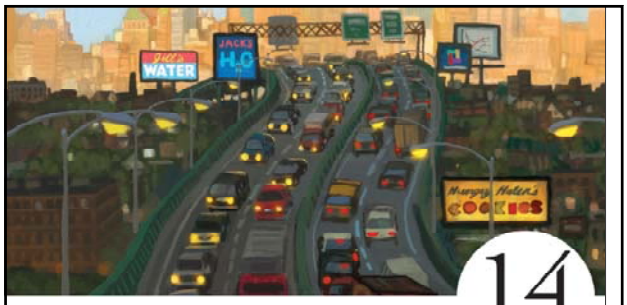

14

Firms in Competitive Markets

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WHAT IS A COMPETITIVE MARKET?
Summary

- A *competitive market* has many buyers and sellers trading identical products so that each buyer and seller is a price taker.
  - Buyers and sellers must accept the price determined by the market.

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The Meaning of Competition
Summary

- 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
Summary

- 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 Revenue of a Competitive Firm
Summary

- Total revenue for a firm is the selling price times the quantity sold.
- $TR = (P \times Q)$
- Total revenue is proportional to the amount of output.

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The Revenue of a Competitive Firm Summary

- *Average revenue* tells us how much revenue a firm receives for the typical unit sold.
- Average revenue is total revenue divided by the quantity sold.

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The Revenue of a Competitive Firm Summary

- 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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The Revenue of a Competitive Firm Summary

- *Marginal revenue* is the change in total revenue from an additional unit sold.
- $MR = \Delta TR/\Delta Q$
- For competitive firms, marginal revenue equals the price of the good.

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Summary

Table 1 Total, Average, and Marginal Revenue for a Competitive Firm

Quantity (Q)	Price (P)	Total Revenue ($TR = P \times Q$)	Average Revenue ($AR = TR/Q$)	Marginal Revenue ($MR = \Delta TR/\Delta Q$)
1 gallon	$6	$ 6	$6	
				$6
2	6	12	6	
				6
3	6	18	6	
				6
4	6	24	6	
				6
5	6	30	6	
				6
6	6	36	6	
				6
7	6	42	6	
				6
8	6	48	6	

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PROFIT MAXIMIZATION AND THE COMPETITIVE FIRM'S SUPPLY CURVE Summary

- 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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Summary

Table 2 Profit Maximization: A Numerical Example

Quantity (Q)	Total Revenue (TR)	Total Cost (TC)	Profit ($TR - TC$)	Marginal Revenue ($MR = \Delta TR/\Delta Q$)	Marginal Cost ($MC = \Delta TC/\Delta Q$)	Change in Profit ($MR - MC$)
0 gallons	$ 0	$ 3	–$3			
				$6	$2	$4
1	6	5	1			
				6	3	3
2	12	8	4			
				6	4	2
3	18	12	6			
				6	5	1
4	24	17	7			
				6	6	0
5	30	23	7			
				6	7	–1
6	36	30	6			
				6	8	–2
7	42	38	4			
				6	9	–3
8	48	47	1			

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The Marginal Cost Curve and the Firm's Supply Decision

Summary

- Profit maximization occurs at the quantity where *marginal revenue equals marginal cost*.
  - When *MR* > *MC*, *in*crease *Q*
  - When *MR* < *MC*, *de*crease *Q*
  - When *MR* = *MC*, profit is maximized.

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Figure 1 Profit Maximization for a Competitive Firm

Summary

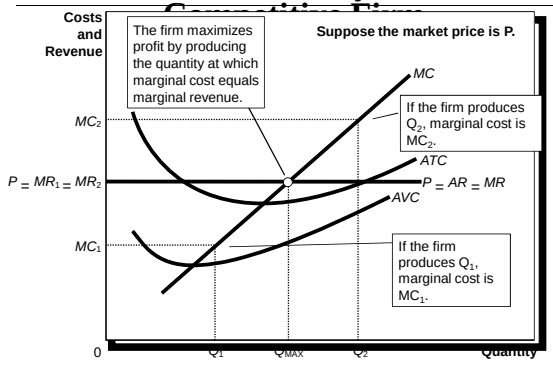

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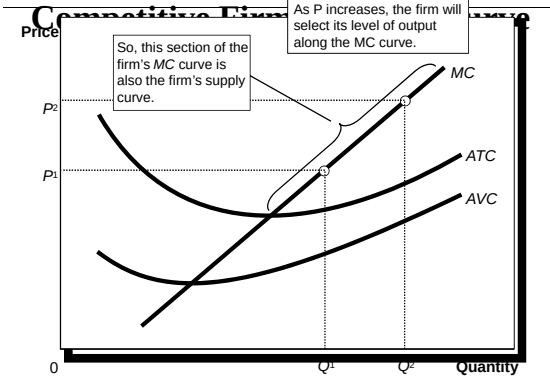
Figure 2 Marginal Cost as the Competitive Firm's Supply Curve

Summary



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The Firm's Short-Run Decision to Shut Down

Summary

- 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

Summary

- 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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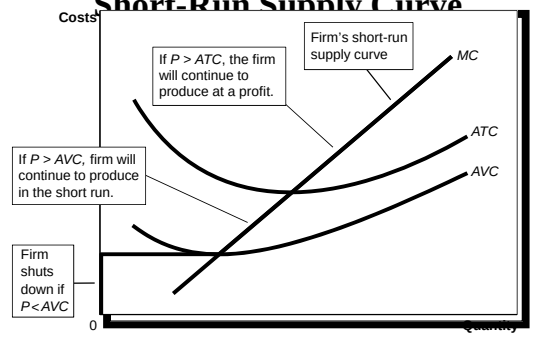
Figure 3 The Competitive Firm's Short-Run Supply Curve

Summary



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Spilt Milk and Other Sunk Costs Summary

- 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 Summary

- 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 Summary

- 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 Summary

- 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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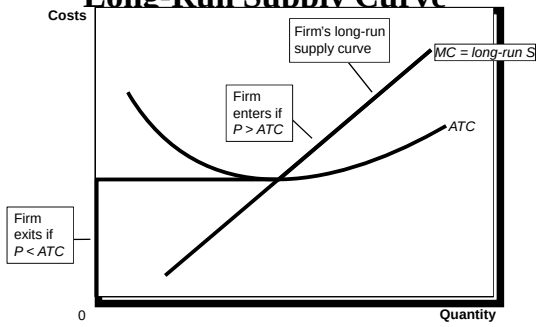
Figure 4 The Competitive Firm's Long-Run Supply Curve Summary



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Measuring Profit in Our Graph for the Competitive Firm Summary

- Profit = $TR - TC$
- Profit = $(TR/Q - TC/Q) \times Q$
- Profit = $(P - ATC) \times Q$

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Figure 5 Profit as the Area between Price and Average Total Cost

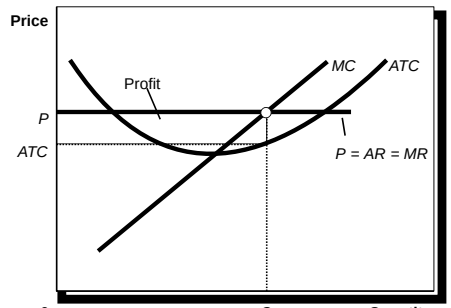

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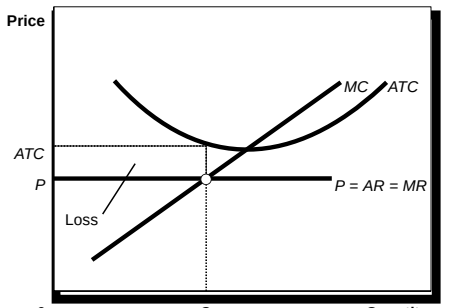
Figure 5 Profit as the Area between Price and Average Total Cost



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THE SUPPLY CURVE IN A COMPETITIVE MARKET

Summary

- 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 SUPPLY CURVE IN A COMPETITIVE MARKET

Summary

- 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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THE SUPPLY CURVE IN A COMPETITIVE MARKET

Summary

- 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

Summary

- 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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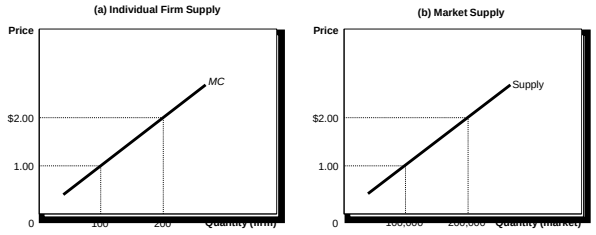
Figure 6 Short-Run Market Supply



If the industry has 1000 identical firms, then at each market price, industry output will be 1000 times larger than the representative firm's output.

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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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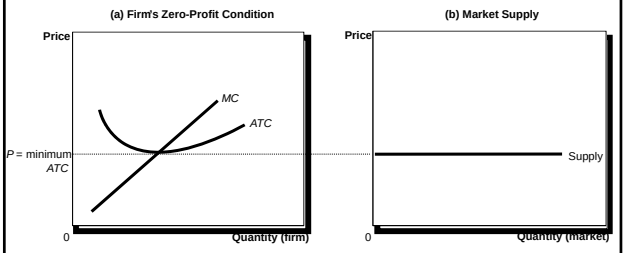
Figure 7 Long-Run Market Supply



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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 and 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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Why Do Competitive Firms Stay in Business If They Make 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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A Shift in Demand in the Short Run and

- 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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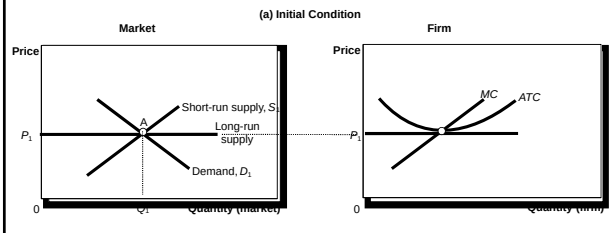
Figure 8 An Increase in Demand in the Short Run and Long Run



A market begins in long run equilibrium.

And firms earn zero profit.

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Figure 8 An Increase in Demand in the Short Run and Long Run

An increase in market demand…

The higher P encourages firms to produce more and generates profit in the short run.

…raises price and output.

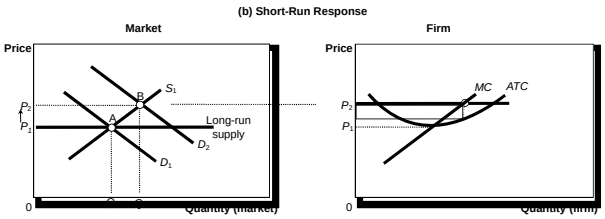

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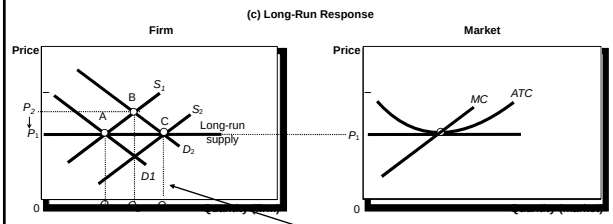
Figure 8 An Increase in Demand in the Short Run and Long Run

Profits induce entry and market supply increases.



The increase in supply lowers market price.

In the long run market price is restored, but market supply is greater.

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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.
- 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.
- In the long run, the number of firms adjusts to drive the market back to the zero-profit equilibrium.

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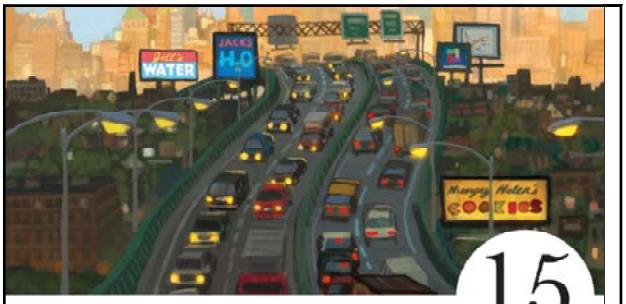

15

Monopoly

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Monopoly Summary

- While a competitive firm is a *price taker*, a monopoly firm is a *price maker*.
- 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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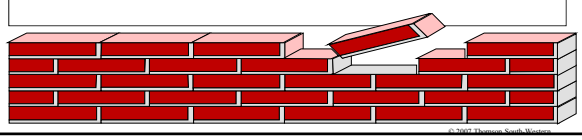
WHY MONOPOLIES ARISE Summary

- The fundamental cause of monopoly is *barriers to entry*.



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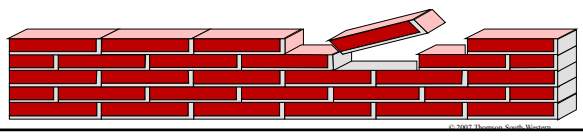
WHY MONOPOLIES ARISE Summary

- 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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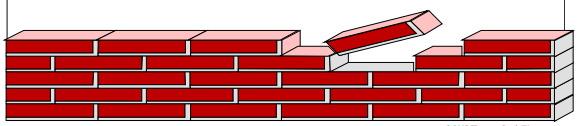
Monopoly Resources Summary

- 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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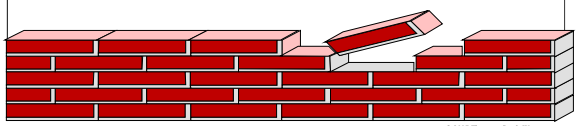
Government-Created Monopolies Summary

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

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

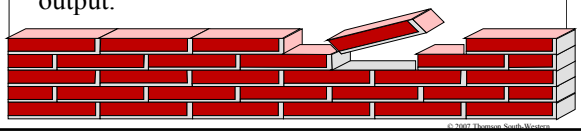

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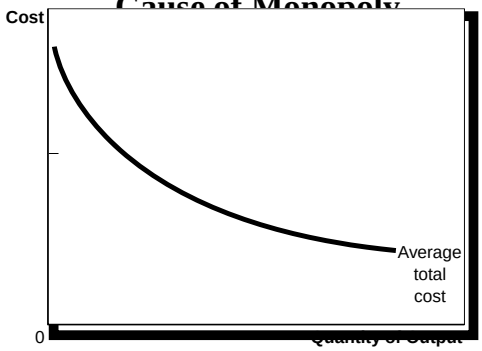
Figure 1 Economies of Scale as a Cause of Monopoly Summary



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Summary

HOW MONOPOLIES MAKE PRODUCTION AND PRICING DECISIONS

- Monopoly versus Competition
  - Monopoly
    - Is the sole producer
    - Faces a downward-sloping demand curve
    - Is a price maker
    - Reduces price to increase sales
  - Competitive Firm
    - Is one of many producers
    - Faces a horizontal demand curve
    - Is a price taker
    - Sells as much or as little at same price

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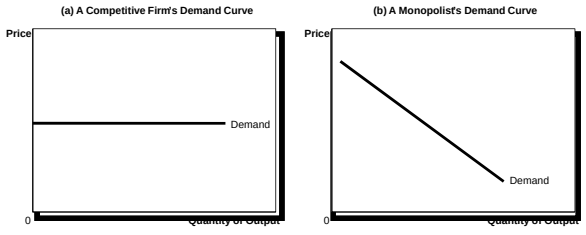
Figure 2 Demand Curves for Competitive and Monopoly Firms Summary



Since a monopoly is the sole producer in its market, it faces the market demand curve.

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A Monopoly's Revenue Summary

- Total Revenue
  - $P \times Q = TR$
- Average Revenue
  - $TR/Q = AR = P$
- Marginal Revenue
  - $\Delta TR/\Delta Q = MR$

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Table 1 A Monopoly's Total, Average, and Marginal Revenue Summary

Quantity of Water (Q)	Price (P)	Total Revenue (TR = P × Q)	Average Revenue (AR = TR/Q)	Marginal Revenue (MR = ΔTR/ΔQ)
0 gallons	$11	$ 0	—	
				$10
1	10	10	$10	
				8
2	9	18	9	
				6
3	8	24	8	
				4
4	7	28	7	
				2
5	6	30	6	
				0
6	5	30	5	
				–2
7	4	28	4	
				–4
8	3	24	3	

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A Monopoly's Revenue Summary

- 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 Revenue Summary

- A Monopoly's Marginal Revenue
  - When a monopoly increases the amount it sells, it has two effects on total revenue ($P \times Q$).
    - The output effect—more output is sold, so Q is higher.
    - The price effect—price falls, so P is lower.

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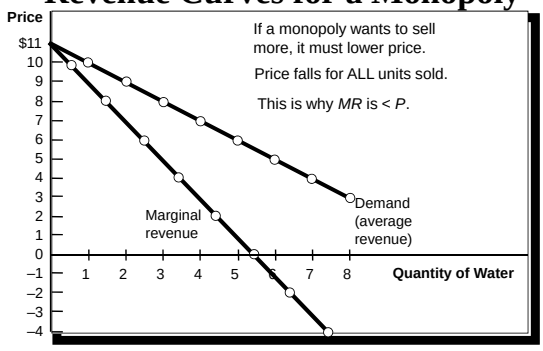
Figure 3 Demand and Marginal-Revenue Curves for a Monopoly Summary



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Profit Maximization Summary

- 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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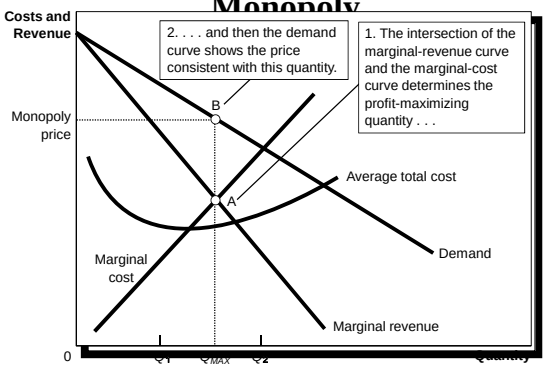
Figure 4 Profit Maximization for a Monopoly



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Summary

Profit Maximization Summary

- Comparing Monopoly and Competition
  - For a competitive firm, price equals marginal cost.
    - $P = MR = MC$
  - For a monopoly firm, price exceeds marginal cost.
    - $P > MR = MC$
- Remember, all profit-maximizing firms set $MR = MC$.

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A Monopoly's Profit Summary

- Profit equals total revenue minus total costs.
  - Profit = $TR - TC$
  - Profit = $(TR/Q - TC/Q) \times Q$
  - Profit = $(P - ATC) \times Q$

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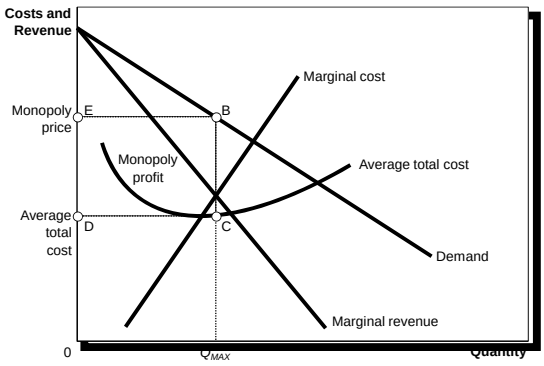
Figure 5 The Monopolist's Profit Summary



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A Monopolist's Profit Summary

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

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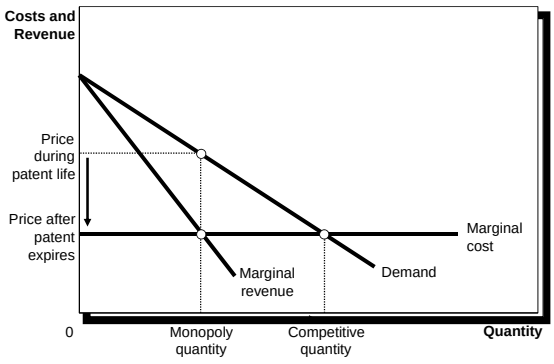
Figure 6 The Market for Drugs Summary



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THE WELFARE COST OF MONOPOLY

Summary

- 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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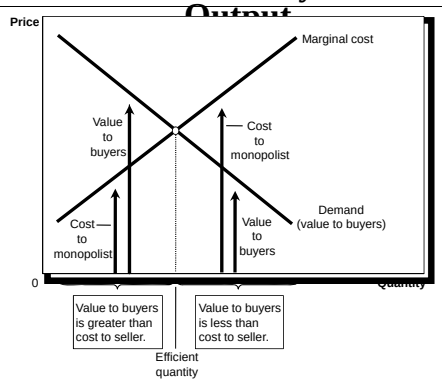
Figure 7 The Efficient Level of Output

Summary



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The Deadweight Loss

Summary

- 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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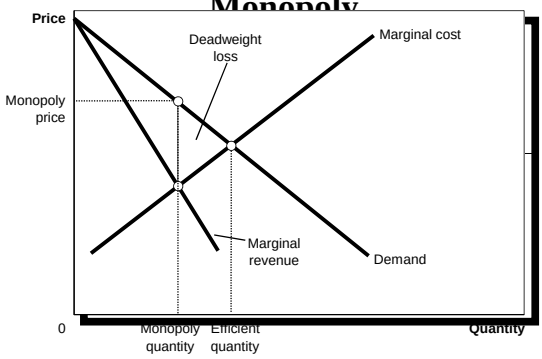
Figure 8 The Inefficiency of Monopoly

Summary



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The Deadweight Loss

Summary

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

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The Monopoly's Profit: A Social Cost?

Summary

- 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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Summary
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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Summary
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 that make markets less competitive.

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Summary
Increasing Competition with Antitrust Laws

- Two Important Antitrust Laws
  - Sherman Antitrust Act (1890)
    - Reduced the market power of the large and powerful "trusts" of that time period.
  - Clayton Antitrust Act (1914)
    - Strengthened the government's powers and authorized private lawsuits.

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Summary
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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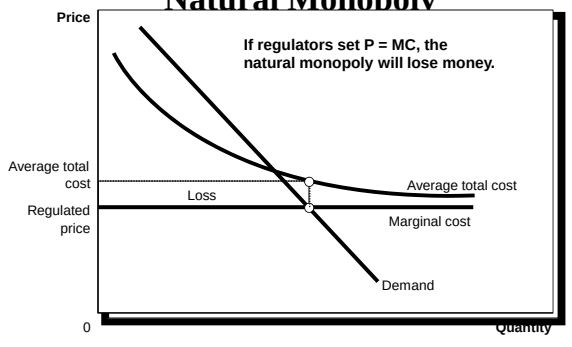
Summary
Figure 9 Marginal-Cost Pricing for a Natural Monopoly



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Summary
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 Summary

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

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Doing Nothing Summary

- 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 Summary

- *Price discrimination* is the business 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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The Analytics of Price Discrimination Summary

- 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*.
- 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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The Analytics of Price Discrimination Summary

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

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Figure 10 Welfare with and without Price Discrimination Summary

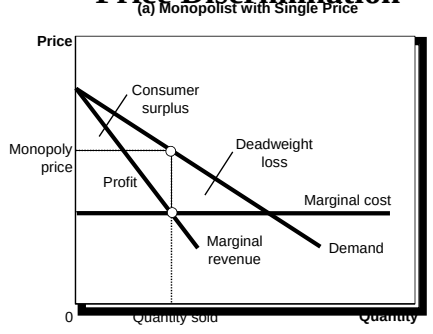

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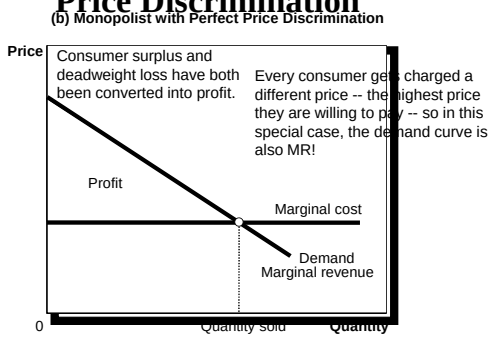
Figure 10 Welfare with and without Price Discrimination



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Summary

Examples of Price Discrimination

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

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Summary

CONCLUSION: 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

Table 2 Competition versus Monopoly: A Summary Comparison

	Competition	Monopoly
Similarities		
Goal of firms	Maximize profits	Maximize profits
Rule for maximizing	$MR = MC$	$MR = MC$
Can earn economic profits in the short run?	Yes	Yes
Differences		
Number of firms	Many	One
Marginal revenue	$MR = P$	$MR < P$
Price	$P = MC$	$P > MC$
Produces welfare-maximizing level of output?	Yes	No
Entry in long run?	Yes	No
Can earn economic profits in long run?	No	Yes
Price discrimination possible?	No	Yes

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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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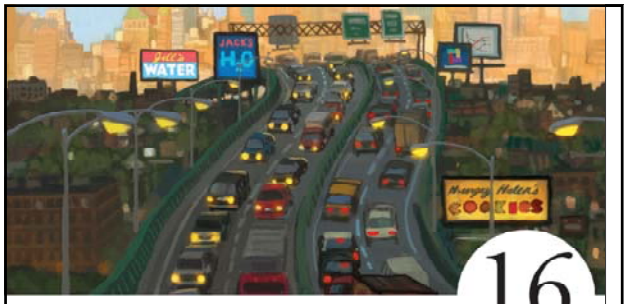

16

Oligopoly

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BETWEEN MONOPOLY AND PERFECT COMPETITION Summary

- Imperfect competition refers to those market structures that fall between perfect competition and pure monopoly.
- 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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BETWEEN MONOPOLY AND PERFECT COMPETITION Summary

- 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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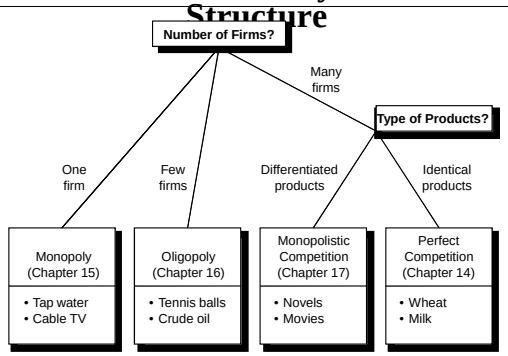
Figure 1 The Four Types of Market Structure



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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.
- 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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Table 1 The Demand Schedule for Water

Quantity (in gallons)	Price	Total Revenue (and total profit)
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:
    - $P = MC = \$0$
    - $Q = 120$ gallons
  - The price and quantity in a monopoly market would be where total profit is maximized:
    - $P = \$60$
    - $Q = 60$ 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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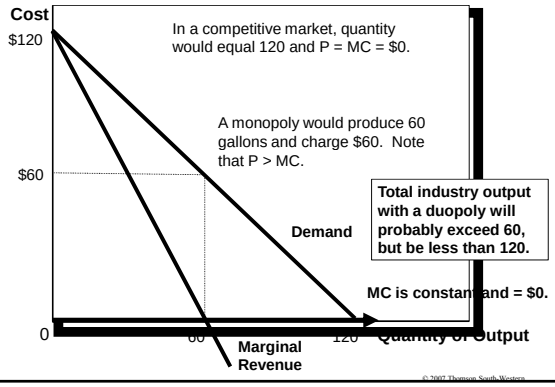
The Market for Water Summary



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Competition, Monopolies, and Cartels Summary

- The duopolists may agree on a monopoly outcome.
  - *Collusion*
    - An agreement among firms in a market about quantities to produce or prices to charge.
  - *Cartel*
    - A group of firms acting in unison.

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Competition, Monopolies, and Cartels Summary

- 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 Summary

- 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 Summary

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

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Equilibrium for an Oligopoly Summary

- Summary
  - 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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How the Size of an Oligopoly Affects the Market Outcome
Summary

- 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 will increase the amount sold, which will lower 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
Summary

- 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
Summary

- *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
Summary

- 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 produces but also on how much the other firms produce.

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The Prisoners' Dilemma
Summary

- 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
Summary

- The prisoners' dilemma is a particular "game" between two captured prisoners that illustrates why cooperation is difficult to maintain even when it is mutually beneficial.

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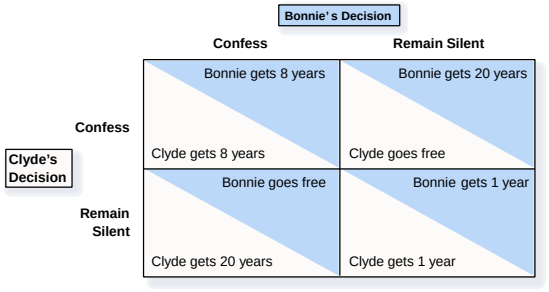
Figure 2 The Prisoners' Dilemma



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Summary

Oligopolies as a Prisoners' Dilemma

- The dominant strategy is the best strategy for a player to follow regardless of the strategies chosen by the other players.
- Cooperation is difficult to maintain, because cooperation is not in the best interest of the individual player.

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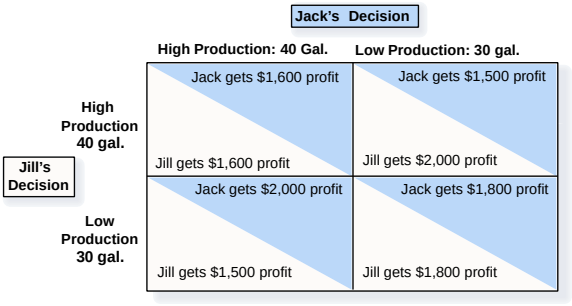
Summary

Figure 3 Jack and Jill's Oligopoly Game



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Summary

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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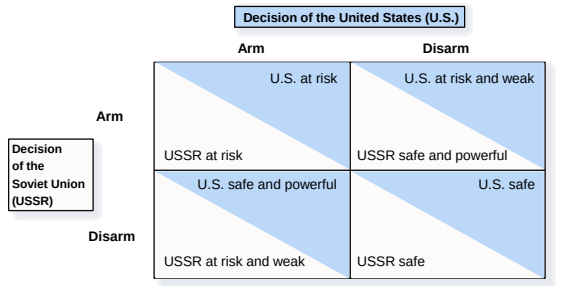
Summary

Figure 4 An Arms-Race Game



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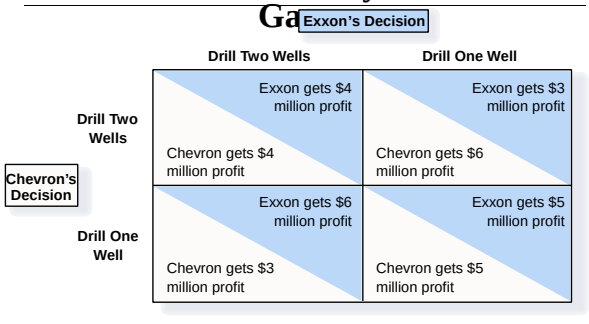
Summary

Figure 5 A Common-Resource Game



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Summary

Why People Sometimes Cooperate Summary

- 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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PUBLIC POLICY TOWARD OLIGOPOLIES Summary

- 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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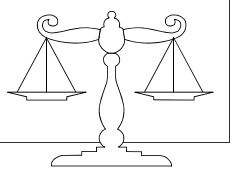
Restraint of Trade and the Antitrust Laws Summary

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



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Controversies over Antitrust Policy Summary

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

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Controversies over Antitrust Policy Summary

- Resale Price Maintenance (or fair trade)
  - occurs when suppliers (like wholesalers) require retailers to charge a specific amount
- 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
- Tying
  - 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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17

Monopolistic Competition

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Monopolistic Competition Summary

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

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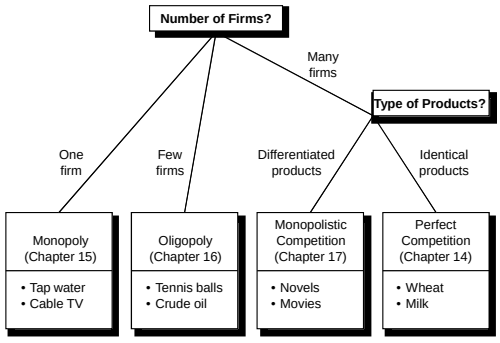
The Four Types of Market Structure Summary



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Monopolistic Competition Summary

- 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 Summary

- Markets that have some features of competition and some features of monopoly.
- Attributes of monopolistic competition:
  - Many sellers
  - Product differentiation
  - Free entry and exit

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Monopolistic Competition Summary

- 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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Monopolistic Competition Summary

- 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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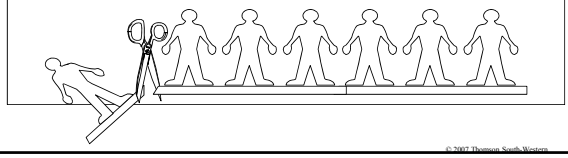
Monopolistic Competition Summary

- 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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COMPETITION WITH DIFFERENTIATED PRODUCTS Summary

- The Monopolistically Competitive Firm 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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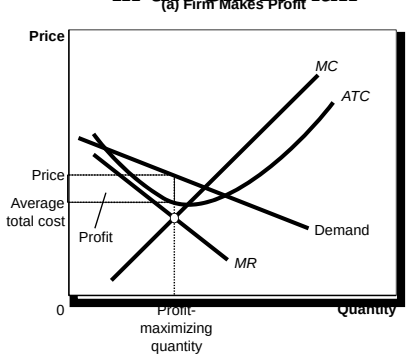
Figure 1 Monopolistic Competition in the Short Run Summary



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Summary: The Monopolistically Competitive Firm in the Short Run

- Short-run economic losses encourage firms to *exit the market*.
  - 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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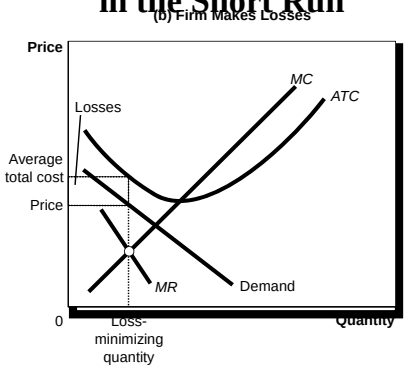
Summary: Figure 1 Monopolistic Competitors in the Short Run



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Summary: The Long-Run Equilibrium

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

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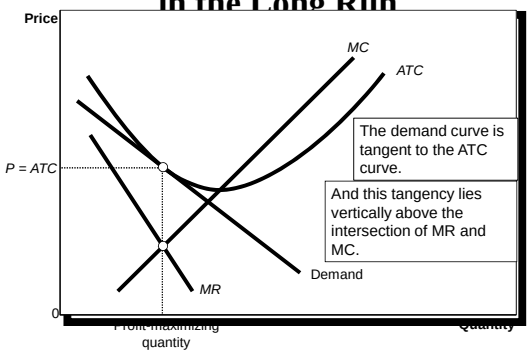
Summary: Figure 2 A Monopolistic Competitor in the Long Run



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Summary: The Long-Run Equilibrium

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

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Summary: Monopolistic versus Perfect Competition

- There are two noteworthy differences between monopolistic and perfect competition:
  - Excess capacity
  - Markup over marginal cost

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Monopolistic versus Perfect Competition Summary

- 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.
  - 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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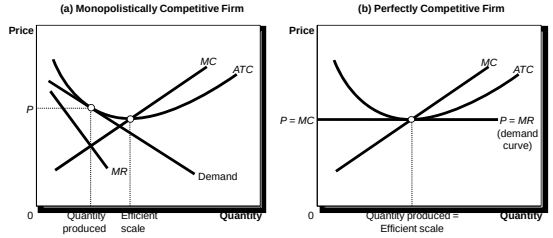
Figure 3 Monopolistic versus Perfect Competition Summary



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Monopolistic versus Perfect Competition Summary

- Markup over Marginal Cost
  - For a competitive firm, price equals marginal cost.
  - For a monopolistically competitive firm, price exceeds 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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Figure 3 Monopolistic versus Perfect Competition Summary

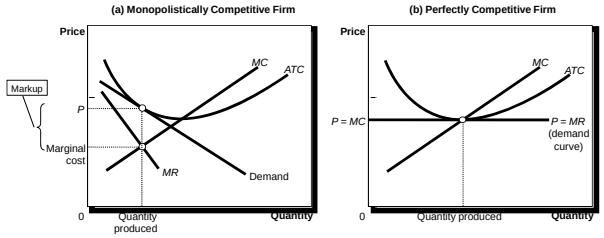

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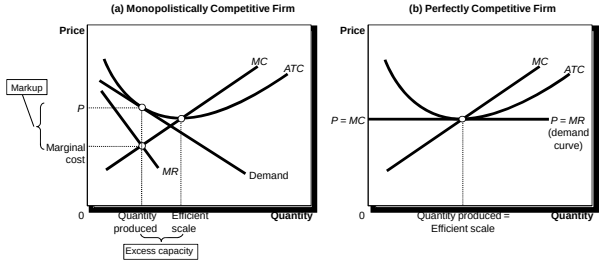
Figure 3 Monopolistic versus Perfect Competition Summary



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Monopolistic Competition and the Welfare of Society Summary

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

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Monopolistic Competition and the Welfare of Society Summary

- 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 Summary

- 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 Summary

- Externalities of entry include:
  - Product-variety externalities.
    - Because consumers get some consumer surplus from the introduction of a new product, entry of a new firm conveys a positive externality on consumers.
  - Business-stealing externalities.
    - 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 Summary

- 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 Summary

- 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 $200 billion a year, is spent on advertising.

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The Debate over Advertising Summary

- 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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The Debate over Advertising Summary

- Defenders argue that advertising provides information to consumers
- They also argue that advertising increases competition by offering a greater variety of products and prices.

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Advertising as a Signal of Quality Summary

- 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 Summary

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

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Brand Names Summary

- 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

Table 1 Monopolistic Competition: Between Perfect Competition and Monopoly

	Market Structure		
	Perfect Competition	Monopolistic Competition	Monopoly
Features that all three market structures share			
Goal of firms	Maximize profits	Maximize profits	Maximize profits
Rule for maximizing	$MR = MC$	$MR = MC$	$MR = MC$
Can earn economic profits in the short run?	Yes	Yes	Yes
Features that monopolistic competition shares with monopoly			
Price taker?	Yes	No	No
Price	$P = MC$	$P > MC$	$P > MC$
Produces welfare-maximizing level of output?	Yes	No	No
Features that monopolistic competition shares with competition			
Number of firms	Many	Many	One
Entry in long run?	Yes	Yes	No
Can earn economic profits in long run?	No	No	Yes

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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 argue that firms use advertising and brand names to take advantage of consumer irrationality and to reduce competition.
  - 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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21

The Theory of Consumer Choice

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The Theory of Consumer Choice Summary

- The theory of consumer choice addresses the following questions:
  - Do all demand curves slope downward?
  - How do wages affect labor supply?
  - How do interest rates affect household saving?

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Summary

~~THE BUDGET CONSTRAINT: WHAT~~ THE CONSUMER CAN AFFORD

- The *budget constraint* depicts the limit on the consumption "bundles" that a consumer can afford.
  - People consume less than they desire because their spending is constrained, or limited, by their income.

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Summary

~~THE BUDGET CONSTRAINT: WHAT~~ THE CONSUMER CAN AFFORD

- The budget constraint shows the various combinations of goods the consumer can afford given his or her income and the prices of the two goods.

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Figure 1 The Consumer's Budget Constraint

Pints of Pepsi	Number of Pizzas	Spending on Pepsi	Spending on Pizza	Total Spending
0	100	$ 0	$1,000	$1,000
50	90	100	900	1,000
100	80	200	800	1,000
150	70	300	700	1,000
200	60	400	600	1,000
250	50	500	500	1,000
300	40	600	400	1,000
350	30	700	300	1,000
400	20	800	200	1,000
450	10	900	100	1,000
500	0	1,000	0	1,000

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Summary

THE BUDGET CONSTRAINT: WHAT THE CONSUMER CAN AFFORD

- The Consumer's Budget Constraint
  - Any point on the budget constraint line indicates the consumer's combination or trade-off between two goods.
  - For example, if the consumer buys no pizzas, he can afford 500 pints of Pepsi (point B). If he buys no Pepsi, he can afford 100 pizzas (point A).

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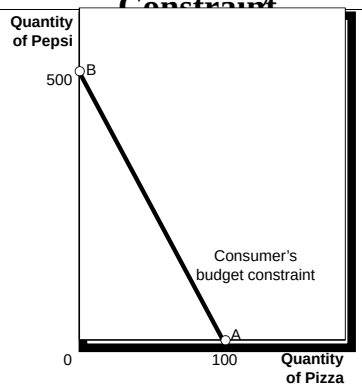
Figure 1 The Consumer's Budget Constraint



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Summary

THE BUDGET CONSTRAINT: WHAT THE CONSUMER CAN AFFORD

- The Consumer's Budget Constraint
  - Alternately, the consumer can buy 50 pizzas and 250 pints of Pepsi.

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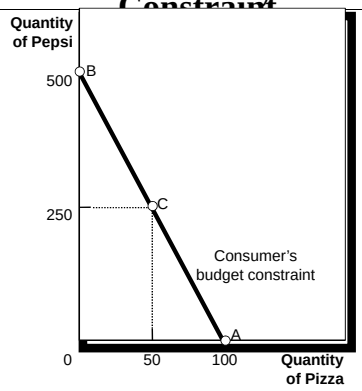
Figure 1 The Consumer's Budget Constraint



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Summary

THE BUDGET CONSTRAINT: WHAT THE CONSUMER CAN AFFORD

- The *slope* of the budget constraint line equals the relative price of the two goods, that is, *the price of one good compared to the price of the other*.
- It measures the rate at which the consumer can trade one good for the other.

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Summary

PREFERENCES: WHAT THE CONSUMER WANTS

- A consumer's preference among consumption bundles may be illustrated with indifference curves.

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Summary

Representing Preferences with Indifference Curves

- An *indifference curve* is a curve that shows consumption bundles that give the consumer the same level of satisfaction.

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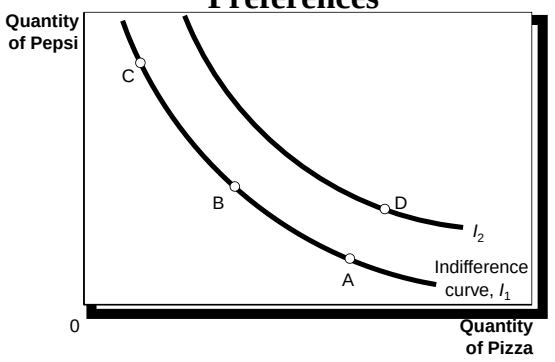
Summary

Figure 2 The Consumer's Preferences



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Summary

Representing Preferences with Indifference Curves

- The Consumer's Preferences
  - The consumer is indifferent, or equally happy, with the combinations shown at points A, B, and C because they are all on the same curve.
- The Marginal Rate of Substitution
  - The slope at any point on an indifference curve is the *marginal rate of substitution*.
    - It is the rate at which a consumer is willing to trade one good for another.
    - It is the amount of one good that a consumer requires as compensation to give up one unit of the other good.

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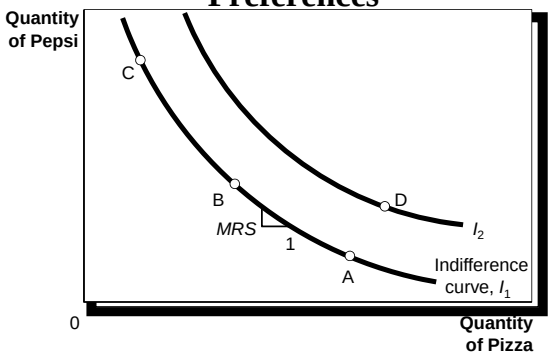
Summary

Figure 2 The Consumer's Preferences



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Summary

Four Properties of Indifference Curves

- Higher indifference curves are preferred to lower ones.
- Indifference curves are downward sloping.
- Indifference curves do not cross.
- Indifference curves are bowed inward.

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Four Properties of Indifference Curves Summary

- Property 1: Higher indifference curves are preferred to lower ones.
  - Consumers usually prefer more of something to less of it.
  - Higher indifference curves represent larger quantities of goods than do lower indifference curves.

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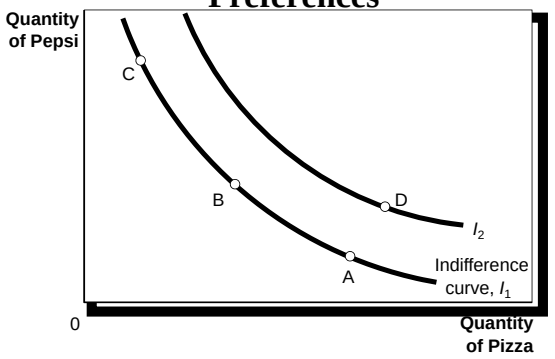
Figure 2 The Consumer's Preferences Summary



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Four Properties of Indifference Curves Summary

- Property 2: Indifference curves are downward sloping.
  - A consumer is willing to give up one good only if he or she gets more of the other good in order to remain equally happy.
  - If the quantity of one good is reduced, the quantity of the other good must increase.
  - For this reason, most indifference curves slope downward.
  - Remember, a consumer is equally happy at all points along a given indifference curve.

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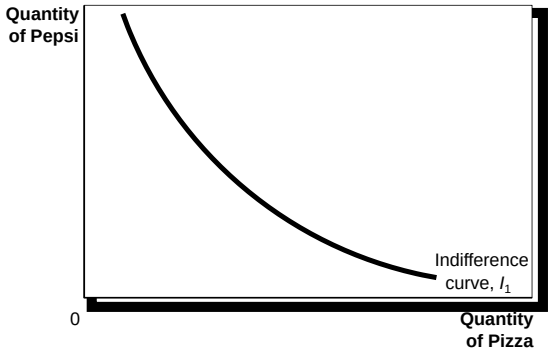
Figure 2 The Consumer's Preferences Summary



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Four Properties of Indifference Curves Summary

- Property 3: Indifference curves do not cross.
  - Points A and B should make the consumer equally happy.
  - Points B and C should make the consumer equally happy.
  - This implies that A and C would make the consumer equally happy.
  - But C has more of both goods compared to A.

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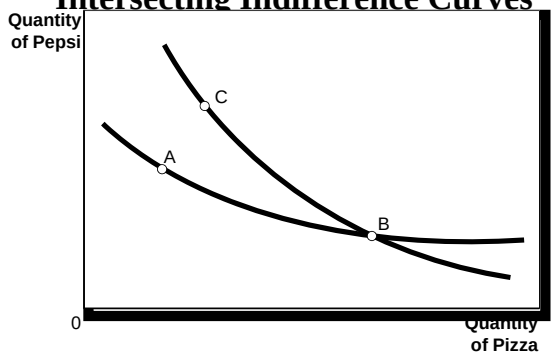
Figure 3 The Impossibility of Intersecting Indifference Curves Summary



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Four Properties of Indifference Curves Summary

- Property 4: Indifference curves are bowed inward.
  - People are more willing to trade away goods that they have in abundance and less willing to trade away goods of which they have little.
  - These differences in a consumer's marginal substitution rates cause his or her indifference curve to bow inward.

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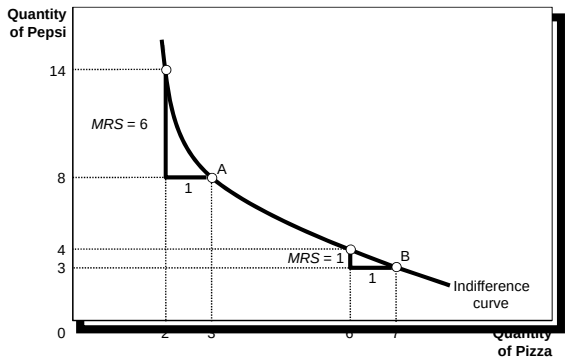
Figure 4 Bowed Indifference Curves Summary



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Two Extreme Examples of Indifference Curves Summary

- Perfect substitutes
- Perfect complements

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Two Extreme Examples of Indifference Curves Summary

- Perfect Substitutes
  - Two goods with straight-line indifference curves are *perfect substitutes.*
  - The marginal rate of substitution is a fixed number.

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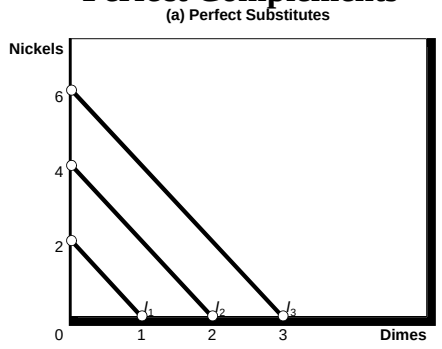
Figure 5 Perfect Substitutes and Perfect Complements Summary



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Two Extreme Examples of Indifference Curves Summary

- Perfect Complements
  - Two goods with right-angle indifference curves are *perfect complements.*
  - Since these goods are always used together, extra units of one good, outside the desired consumption ratio, add no additional satisfaction.

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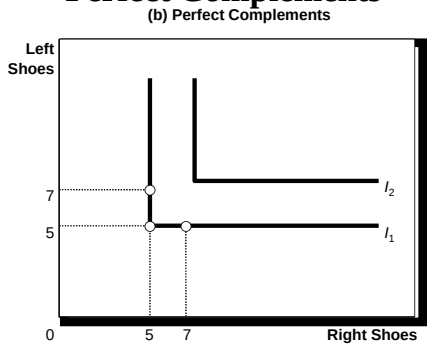
Figure 5 Perfect Substitutes and Perfect Complements



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Summary

OPTIMIZATION: WHAT THE CONSUMER CHOOSES

- Consumers want to get the combination of goods on the highest possible indifference curve.
- However, the consumer must also end up on or below his budget constraint.

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The Consumer's Optimal Choices

Summary

- Combining the indifference curve and the budget constraint determines the consumer's optimal choice.
- Consumer optimum occurs at the point where the highest indifference curve and the budget constraint are tangent.

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The Consumer's Optimal Choice

Summary

- The consumer chooses consumption of the two goods so that the marginal rate of substitution equals the relative price.
- At the consumer's optimum, the consumer's valuation of the two goods equals the market's valuation.

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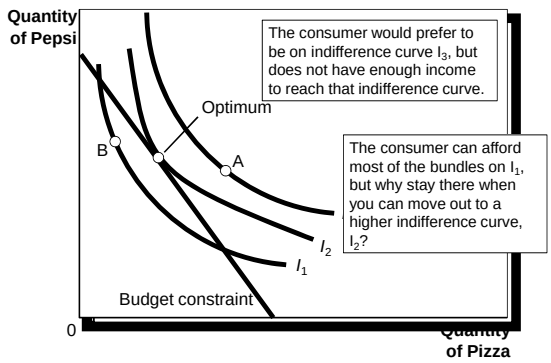
Figure 6 The Consumer's Optimum

Summary



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How Changes in Income Affect the Consumer's Choices

Summary

- An increase in income shifts the budget constraint outward.
  - The consumer is able to choose a better combination of goods on a higher indifference curve.

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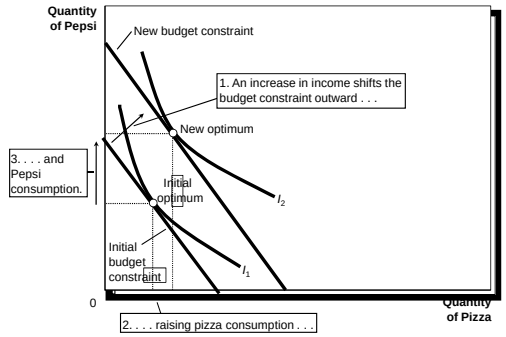
Figure 7 An Increase in Income



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Summary

How Changes in Income Affect the Consumer's Choices

- Normal versus Inferior Goods
  - If a consumer buys more of a good when his or her income rises, the good is called a *normal good*.
  - If a consumer buys less of a good when his or her income rises, the good is called an *inferior good*.

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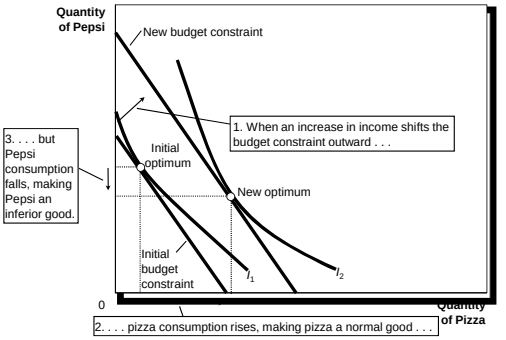
Figure 8 An Inferior Good



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Summary

How Changes in Prices Affect Consumer's Choices

- A fall in the price of any good rotates the budget constraint outward and changes the slope of the budget constraint.

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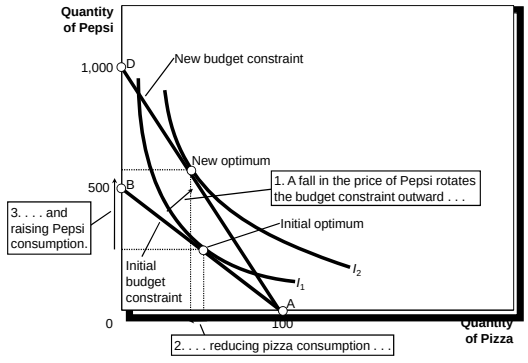
Figure 9 A Change in Price



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Summary

Income and Substitution Effects

- A price change has two effects on consumption.
  - An income effect
  - A substitution effect

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Income and Substitution Effects Summary

- The Income Effect
  - The *income effect* is the change in consumption that results when a price change moves the consumer to a higher or lower indifference curve.
- The Substitution Effect
  - The *substitution effect* is the change in consumption that results when a price change moves the consumer along an indifference curve to a point with a different marginal rate of substitution.

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Income and Substitution Effects Summary

- A Change in Price: Substitution Effect
  - A price change first causes the consumer to move from one point on an indifference curve to another on the same curve.
    - Illustrated by movement from point A to point B.
- A Change in Price: Income Effect
  - After moving from one point to another on the same curve, the consumer will move to another indifference curve.
    - Illustrated by movement from point B to point C.

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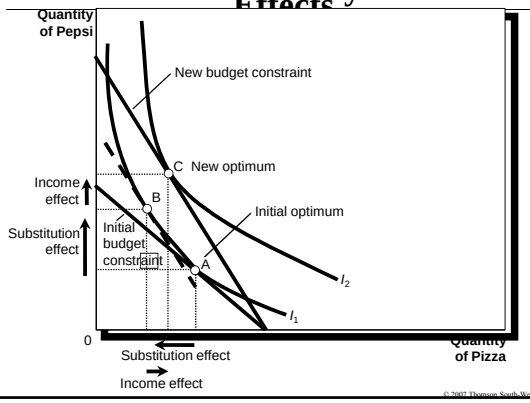
Figure 10 Income and Substitution Effects Summary



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Summary Table 1 Income and Substitution Effects When the Price of Pepsi Falls

Good	Income Effect	Substitution Effect	Total Effect
Pepsi	Consumer is richer, so he buys more Pepsi.	Pepsi is relatively cheaper, so consumer buys more Pepsi.	Income and substitution effects act in same direction, so consumer buys more Pepsi.
Pizza	Consumer is richer, so he buys more pizza.	Pizza is relatively more expensive, so consumer buys less pizza.	Income and substitution effects act in opposite directions, so the total effect on pizza consumption is ambiguous.

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Deriving the Demand Curve Summary

- A consumer's demand curve can be viewed as a summary of the optimal decisions that arise from his or her budget constraint and indifference curves.

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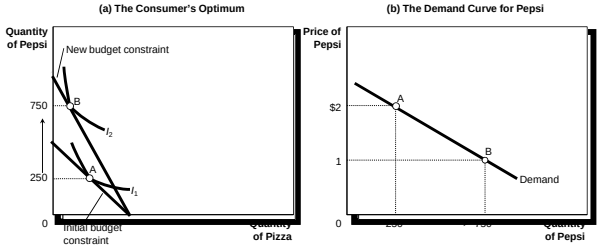
Figure 11 Deriving the Demand Curve Summary



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THREE APPLICATIONS Summary

- Do all demand curves slope downward?
- How do wages affect labor supply?
- How do interest rates affect household saving?

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Do All Demand Curves Slope Downward? Summary

- Demand curves can sometimes slope upward.
- This happens when a consumer buys more of a good when its price rises.
- *Giffen goods*
  - Economists use the term Giffen good to describe an inferior good that violates the law of demand.
  - Giffen goods are goods for which an increase in the price raises the quantity demanded.
  - The income effect dominates the substitution effect.
  - They have demand curves that slope upwards.

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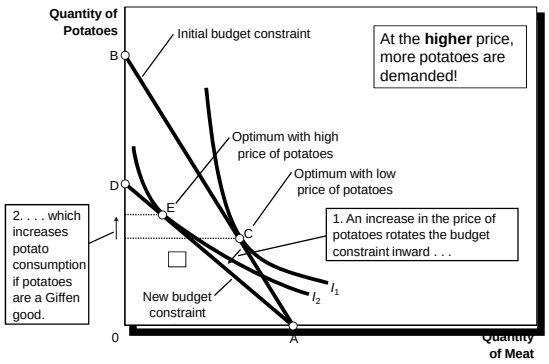
Figure 12 A Giffen Good Summary



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How Do Wages Affect Labor Supply? Summary

- If the substitution effect is greater than the income effect for the worker, he or she works more.
- If income effect is greater than the substitution effect, he or she works less.

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Figure 13 The Work-Leisure Decision Summary

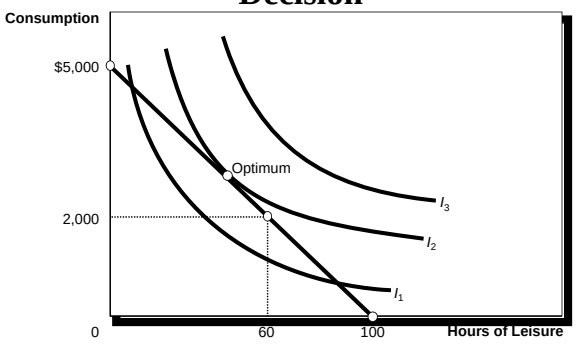

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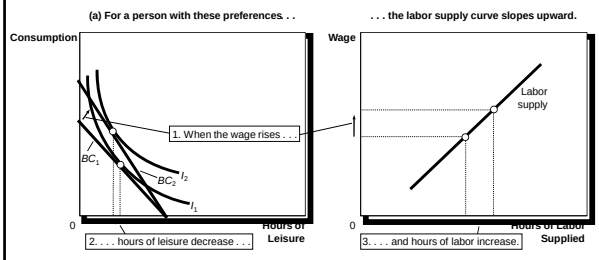
Figure 14 An Increase in the Wage Summary



The opportunity cost of taking leisure has increased, so the individual substitutes consumption for leisure and works more.

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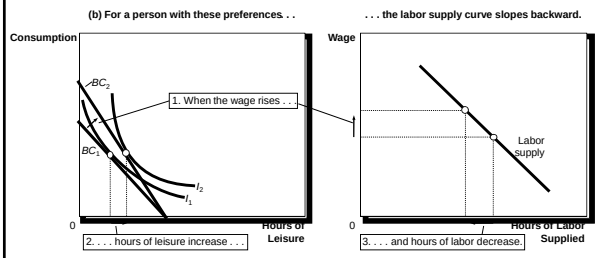
Figure 14 An Increase in the Wage



In this example, the individual uses the higher wage rate to "buy" more leisure and decides to work less.

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Summary

How Do Interest Rates Affect Household Saving?

- If the substitution effect of a higher interest rate is greater than the income effect, households save more.
- If the income effect of a higher interest rate is greater than the substitution effect, households save less.

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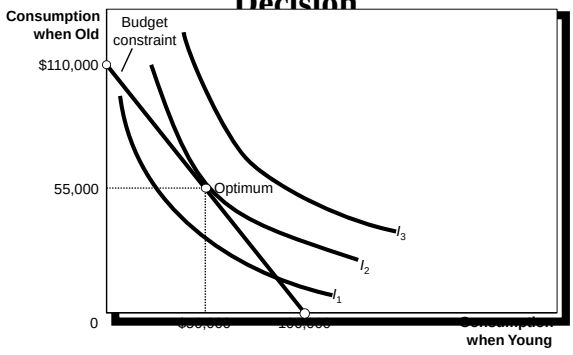
Figure 15 The Consumption-Saving Decision



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Summary

How Do Interest Rates Affect Household Saving?

- Thus, an increase in the interest rate could either encourage or discourage saving.

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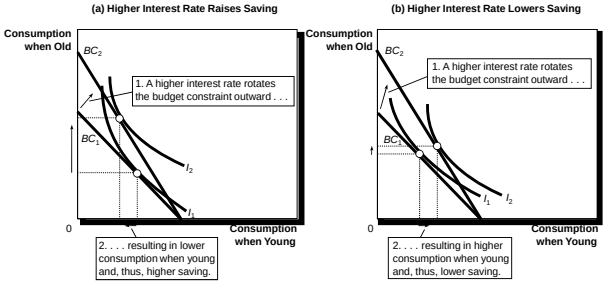
Figure 16 An Increase in the Interest Rate



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Summary

- A consumer's budget constraint shows the possible combinations of different goods he can buy given his income and the prices of the goods.
- The slope of the budget constraint equals the relative price of the goods.
- The consumer's indifference curves represent his preferences.

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Summary

- Points on higher indifference curves are preferred to points on lower indifference curves.
- The slope of an indifference curve at any point is the consumer's marginal rate of substitution.
- The consumer optimizes by choosing the point on his budget constraint that lies on the highest indifference curve.

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Summary

- When the price of a good falls, the impact on the consumer's choices can be broken down into an income effect and a substitution effect.
- The income effect is the change in consumption that arises because a lower price makes the consumer better off.
- The income effect is reflected by the movement from a lower to a higher indifference curve.

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Summary

- The substitution effect is the change in consumption that arises because a price change encourages greater consumption of the good that has become relatively cheaper.
- The substitution effect is reflected by a movement along an indifference curve to a point with a different slope.

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Summary

- The theory of consumer choice can explain:
  - Why demand curves can potentially slope upward.
  - How wages affect labor supply.
  - How interest rates affect household saving.

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