Efficiency and Equity, Externalities and Public Goods

CHAPTER 5

After studying this chapter you will be able to
- Explain the connection between demand and marginal benefit and define consumer surplus
- Explain the connection between supply and marginal cost and define producer surplus
- Explain the conditions under which markets move resources to their highest-value uses and the sources of inefficiency in our economy

Resource Allocation Methods

Scare resources might be allocated by using any or some combination of the following methods:
- Market price
- Command
- Majority rule
- Contest
- First-come, first-served
- Sharing equally
- Lottery
- Personal characteristics
- Force

How does each method work?

Demand and Marginal Benefit

Demand, Willingness to Pay, and Value

Value is what we get, price is what we pay.

The value of one more unit of a good or service is its marginal benefit.

We measure value as the maximum price that a person is willing to pay.

But willingness to pay determines demand.

A demand curve is a marginal benefit curve.

Individual Demand and Market Demand

The relationship between the price of a good and the quantity demanded by one person is called individual demand.

The relationship between the price of a good and the quantity demanded by all buyers in the market is called market demand.

Figure 5.1 on the next slide shows the connection between individual demand and market demand.

Demand and Marginal Benefit

Lisa and Nick are the only buyers in the market for pizza.

At $1 a slice, the quantity demanded by Lisa is 30 slices.
Demand and Marginal Benefit

Lisa and Nick are the only buyers in the market for pizza.

At $1 a slice, the quantity demanded by Nick is 10 slices.

At $1 a slice, the quantity demanded by Lisa is 30 slices and by Nick is 10 slices.

The quantity demanded by all buyers in the market is 40 slices.

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

Consumer Surplus

**Consumer surplus** is the value of a good minus the price paid for it, summed over the quantity bought.

It is measured by the area under the demand curve and above the price paid, up to the quantity bought.

Figure 5.2 on the next slide shows the consumer surplus from pizza when the market price is $1 a slice.
Supply and Marginal Cost

Supply, Cost, and Minimum Supply-Price
Cost is what the producer gives up, price is what the producer receives.
The cost of one more unit of a good or service is its marginal cost.
Marginal cost is the minimum price that a firm is willing to accept.
But the minimum supply-price determines supply.
A supply curve is a marginal cost curve.

Individual Supply and Market Supply
The relationship between the price of a good and the quantity supplied by one producer is called individual supply.
The relationship between the price of a good and the quantity supplied by all producers in the market is called market supply.
Figure 5.3 on the next slide shows the connection between individual supply and market supply.

The market supply curve is the horizontal sum of the individual supply curves.

Producer Surplus
Producer surplus is the price received for a good minus the minimum-supply price (marginal cost), summed over the quantity sold.
It is measured by the area below the market price and above the supply curve, summed over the quantity sold.
Figure 5.4 on the next slide shows the producer surplus from pizza when the market price is $15 a pizza.

The red areas show the cost of producing the pizzas sold.
The producer surplus is the value of the pizza sold in excess of the cost of producing it.

Efficiency of Competitive Equilibrium
Figure 5.5 shows that a competitive market creates an efficient allocation of resources at equilibrium.
In equilibrium, the quantity demanded equals the quantity supplied.
Is the Competitive Market Efficient?

At the equilibrium quantity, marginal benefit equals marginal cost, so the quantity is the efficient quantity.

When the efficient quantity is produced, total surplus (the sum of consumer surplus and producer surplus) is maximized.

Is the Competitive Market Efficient?

The Invisible Hand

Adam Smith’s “invisible hand” idea in the Wealth of Nations implied that competitive markets send resources to their highest valued use in society.

Consumers and producers pursue their own self-interest and interact in markets.

Market transactions generate an efficient—highest valued—use of resources.

Is the Competitive Market Efficient?

The Invisible Hand at Work Today

The invisible works in our economy today.

It coordinates the self interest of producers and consumers of computers, oranges, and just about every good or service that you can think of.

The cartoon on page 111 shows how the invisible hand sometimes works in surprising ways.

Is the Competitive Market Efficient?

Underproduction and Overproduction

Inefficiency can occur because too little of an item is produced—underproduction—or too much of an item is produced—overproduction.

Is the Competitive Market Efficient?

Underproduction

The efficient quantity is 10,000 pizzas a day.

If production is restricted to 5,000 pizzas a day, there is underproduction and the quantity is inefficient.

A deadweight loss equals the decrease in total surplus—the gray triangle.

This loss is a social loss.
Is the Competitive Market Efficient?

Overproduction
Again, the efficient quantity is 10,000 pizzas a day. If production is expanded to 15,000 pizzas a day, a deadweight loss arises from overproduction. This loss is a social loss.

Is the Competitive Market Efficient?

Obstacles to Efficiency
In competitive markets, underproduction or overproduction arise when there are
- Price and quantity regulations
- Taxes and subsidies
- Externalities
- Public goods and common resources
- Monopoly
- High transactions costs

Is the Competitive Market Fair?

It’s Not Fair if the Result Isn’t Fair
The idea that “it’s not fair if the result isn’t fair” began with utilitarianism, which is the principle that states that we should strive to achieve “the greatest happiness for the greatest number.”

If everyone gets the same marginal utility from a given amount of income, and if the marginal benefit of income decreases as income increases, taking a dollar from a richer person and giving it to a poorer person increases the total benefit. Only when income is equally distributed has the greatest happiness been achieved.

Is the Competitive Market Fair?

Ideas about fairness can be divided into two groups:
- It’s not fair if the result isn’t fair
- It’s not fair if the rules aren’t fair
Is the Competitive Market Fair?

Figure 5.7 shows how redistribution increases efficiency.
Tom is poor and has a high marginal benefit of income.
Jerry is rich and has a low marginal benefit of income.
Taking dollars from Jerry and giving them to Tom until they have equal incomes increases total benefit.

Is the Competitive Market Fair?

Utilitarianism ignores the cost of making income transfers.
Recognizing these costs leads to the big tradeoff between efficiency and fairness.
Because of the big tradeoff, John Rawls proposed that income should be redistributed to point at which the poorest person is as well off as possible.

Is the Competitive Market Fair?

It’s Not Fair If the Rules Aren’t Fair
The idea that “it’s not fair if the rules aren’t fair” is based on the symmetry principle, which is the requirement that people in similar situations be treated similarly.

Is the Competitive Market Fair?

Externalities

In economics, this principle means equality of opportunity, not equality of income. Robert Nozick suggested that fairness is based on two rules:
- The state must create and enforce laws that establish and protect private property.
- Private property may be transferred from one person to another only by voluntary exchange.
This means that if resources are allocated efficiently, they may also be allocated fairly.
A case study on pp. 116-117 examines Nozick’s claim.

An externality is a cost or benefit that arises from production and falls on someone other than the producer, or a cost or benefit that arises from consumption and falls on someone other than the consumer.
A negative externality imposes a cost and a positive externality creates a benefit.
The four types of externality are:
- Negative production externalities
- Positive production externalities
- Negative consumption externalities
- Positive consumption externalities

Negative production externalities are common. Some examples are noise from aircraft and trucks, polluted rivers and lakes, the destruction of animal habitat, and air pollution in major cities from auto exhaust.

Positive production externalities are less common than negative externalities. Two examples arise in honey and fruit production. By locating honeybees next to a fruit orchard, fruit production gets an external benefit from the bees, which pollinate the fruit orchards and boost fruit output; and honey production gets an external benefit from the orchards.

Negative consumption externalities are a common part of everyday life. Smoking in a confined space poses a health risk to others; noisy parties or loud car stereos disturb others.

Positive consumption externalities are also common. When you get a flu vaccination, everyone you come into contact with benefits. When the owner of an historic building restores it, everyone who sees the building gets pleasure.

Private costs and social costs
A private cost of production is a cost that is borne by the producer, and marginal private cost (MC) is the private cost of producing one more unit of a good or service. An external cost of production is a cost that is not borne by the producer but is borne by others. Marginal external cost is the cost of producing one more unit of a good or service that falls on people other than the producer.
Marginal social cost is the marginal cost incurred by the entire society—by the producer and by everyone else on whom the cost falls—and is the sum of marginal private cost and marginal external cost.

That is,

\[ MSC = MC + \text{Marginal external cost}. \]

We express costs in dollars but must remember that the dollars represent the value of a forgone opportunity. Marginal private cost, marginal external cost, and marginal social cost increase with output.

Production and Pollution: How Much?

In the market for a good with an externality that is unregulated, the amount of pollution created depends on the equilibrium quantity of the good produced.

Figure 15.3 shows the equilibrium in an unregulated market with an external cost. The quantity produced is where marginal private cost equals marginal social benefit.
Negative Externalities: Pollution

MSB is less than MSC in the market equilibrium, so the market equilibrium is inefficient.
The efficient quantity is where marginal social cost equals marginal benefit.
The competitive market overproduces and creates a deadweight loss.

Public Goods

What is the essential difference between:
- A city police department and Brinks security
- Fish in the Atlantic Ocean and fish in a fish farm
- A live concert and a concert on television

These and all goods and services can be classified according to whether they are excludable or nonexcludable and rival or nonrival.

Classifying Goods and Resources

Excludable
A good is excludable if only the people who pay for it are able to enjoy its benefits.
Brinks’s security services, East Point Seafood’s fish, and a Coldplay concert are examples.

Nonexcludable
A good is nonexcludable if everyone benefits from it regardless of whether they pay for it.
The services of the LAPD, fish in the Pacific Ocean, and a concert on network television are examples.

Classifying Goods and Resources

Rival
A good is rival if one person’s use of it decreases the quantity available for someone else.
A Brinks’s truck can’t deliver cash to two banks at the same time. A fish can be consumed only once.

Nonrival
A good is nonrival if one person’s use of it does not decrease the quantity available for someone else.
The services of the LAPD and a concert on network television are nonrival.

Classifying Goods and Resources

A Four-Fold Classification

Private Goods
A private good is both rival and excludable.
A can of Coke and a fish on East Point Seafood’s farm are examples of private goods.

Public goods
A public good is both nonrival and nonexcludable. A public good can be consumed simultaneously by everyone, and no one can be excluded from enjoying its benefits.
National defense is the best example of a public good.

Classifying Goods and Resources

Figure 16.1 shows this four-fold classification of goods and services.
Public Goods and the Free-Rider Problem

The value of a private good is the maximum amount that a person is willing to pay for one more unit of it. The value of a public good is the maximum amount that all the people are willing to pay for one more unit of it.

To calculate the value placed on a public good, we use the concepts of total benefit and marginal benefit.

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**The Benefit of a Public Good**

Total benefit is the dollar value that a person places on a given quantity of a good. The greater the quantity of a good, the larger is a person’s total benefit.

Marginal benefit is the increase in total benefit that results from a one-unit increase in the quantity of a good. The marginal benefit of a public good diminishes with the level of the good provided.

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Public Goods and the Free-Rider Problem

Figure 16.2 shows how the marginal social benefit of a public good is the sum of marginal benefits of everyone at each quantity of the good provided.

Part (a) shows Lisa’s marginal benefit.

Part (b) shows Max’s marginal benefit.

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Public Goods and the Free-Rider Problem

The economy’s marginal social benefit of a public good is the sum of the marginal benefits of all individuals at each quantity of the good provided. The economy’s marginal social benefit curve for a public good is the vertical sum of all individual marginal benefit curves.
Public Goods and the Free-Rider Problem

The marginal social benefit curve contrasts with the demand curve for a private good, which is the horizontal sum of the individual demand curves at each price.

The Efficient Quantity of a Public Good

The efficient quantity of a public good is the quantity that maximizes net benefit—total benefit minus total cost. This quantity is the same as the quantity at which marginal social benefit equals marginal social cost.

The total cost curve, \( T_C \), is like the total cost curve for a private good. The total benefit curve, \( T_B \), is just the sum of the marginal benefit at each output level. The efficient quantity is where net benefit is maximized.

Equivalently, the efficient quantity is produced where marginal social benefit equals marginal social cost. If marginal social benefit exceeds marginal social cost, net benefit will increase if output is increased.
Public Goods and the Free-Rider Problem

If marginal social cost exceeds marginal social benefit, net benefit will increase if output is decreased. So the quantity at which marginal social benefit equals marginal social cost maximizes net benefit.

Private Provision
If a private firm tried to produce and sell a public good, almost no one would buy it. The free-rider problem results in too little of the good being produced.

Public Provision
Because the government can tax all the consumers of the public good and force everyone to pay for its provision, public provision overcomes the free-rider problem.
If two political parties compete, each is driven to propose the efficient quantity of a public good.
A party that proposes either too much or too little can be beaten by one that proposes the efficient amount because more people vote for an increase in net benefit.

THE END