


**Public Goods  
and the  
Tax System**


*Chapter*  
**9**

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**CHAPTER CHECKLIST**

1. Distinguish between public goods and private goods, explain the free-rider problem, and explain how the quantity of public goods is determined.
2. Explain the effects of income taxes and review the main ideas about the fairness of the tax system.



**LECTURE TOPICS**

- Public Goods and the Free-Rider Problem
- The Tax System



**9.1 PUBLIC GOODS**

- **Public Goods**
  - Public good**

A good or service that can be consumed simultaneously by everyone and from which no one can be excluded.
  - Private good**

A good or service that can be consumed by only one person at a time and only by those people who have bought it or own it.

## 9.1 PUBLIC GOODS

Goods are either:

### Nonrival

If the consumption of a good or service by one person does not decrease the quantity of the good available for someone else.

or

### Rival

If the consumption of a good or service by one person decreases the good or service by another person.

## 9.1 PUBLIC GOODS

Goods are either:

### Nonexcludable

If it is technologically impossible, or extremely costly, to prevent a person from enjoying the benefits of a good or service.

or

### Excludable

If it is technologically possible to prevent a person from enjoying the benefits of a good or service.

## 9.1 PUBLIC GOODS

Figure 9.1 shows goods that are:

Nonrival and nonexcludable (pure public goods)

Excludable and nonrival

Nonexcludable and rival

Rival and excludable (pure private goods)

	<b>Pure public goods</b> National defense The law Lighthouse	<b>Excludable and nonrival</b> Cable television Website Bridge or tunnel (not congested)
<b>Nonrival</b>		
	<b>Nonexcludable and rival</b> Parking at a shopping mall A crosswalk Fish in the ocean	<b>Pure private goods</b> Food Car House
<b>Rival</b>	<b>Nonexcludable</b>	<b>Excludable</b>

## 9.1 PUBLIC GOODS

### ■ The Free-Rider Problem

Public goods create a free-rider problem.

#### Free rider

A person who enjoys the benefits of a good or service without paying for it.

Because of the free-rider problem, the market would provide too small a quantity of a public good.

To produce the efficient quantity, government action is required.

## 9.1 PUBLIC GOODS

### ■ The Marginal Benefit of a Public Good

The benefit a public good provides is the value of its services.

Because satellite services are nonrival and nonexcludable, they are a public good.

- Everyone consumes the same quantity of them.

To find the economywide value of the satellites, we add together the marginal benefits of everyone in the economy.

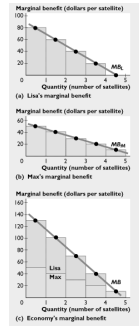
## 9.1 PUBLIC GOODS

Figure 9.2 shows how to sum the marginal benefits in the economy in which Lisa and Max are the only people.

Lisa's marginal benefit curve is  $MB_L$ .

Max's marginal benefit curve is  $MB_M$ .

The  $MB$  curve for the economy is the vertical sum of the marginal benefit curves of everyone in the economy.



## 9.1 PUBLIC GOODS

### ■ The Marginal Cost of a Public Good

Marginal cost increases as the quantity of satellites produced increases—the principle of increasing marginal cost.

So the marginal cost curve of satellites slopes upward.

## 9.1 PUBLIC GOODS

### ■ The Efficient Quantity of a Public Good

Resources are used efficiently if marginal benefit equals marginal cost.

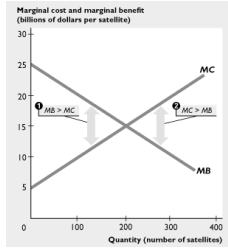
If marginal benefit exceeds marginal cost, resources can be used more efficiently by increasing the quantity produced.

If marginal cost exceeds marginal benefit, resources can be used more efficiently by decreasing the quantity produced.

## 9.1 PUBLIC GOODS

Figure 9.3 shows the efficient quantity of a public good.

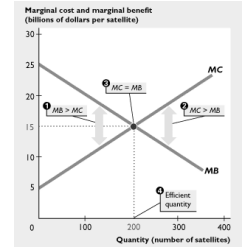
1. If  $MB$  exceeds  $MC$ , an increase in the quantity will make resource use more efficient.
2. If  $MC$  exceeds  $MB$ , a decrease in the quantity will make resource use more efficient.



## 9.1 PUBLIC GOODS

3. If  $MB$  equals  $MC$ , resource use is efficient.

4. The efficient quantity is 200 satellites.



## 9.1 PUBLIC GOODS

### Private Provision

No one would have an incentive to buy his or her share of the satellite system—the free-rider problem.

So a private firm would not supply satellites.

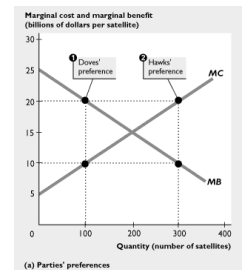
### Public Provision

The political process determines the quantity of a public good provided.

## 9.1 PUBLIC GOODS

Figure 9.4(a) shows the preferences of two political parties in an election.

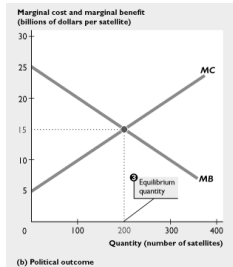
1. Doves would like to provide 100 satellites.
2. The Hawks would like to provide 300 satellites.



## 9.1 PUBLIC GOODS

Figure 9.4(b) shows an efficient political outcome.

3. The political outcome is 200 satellites because, unless each party proposes 200 satellites, the other party can beat it in the election.



## 9.1 PUBLIC GOODS

### Principle of Minimum Differentiation

#### Principle of minimum differentiation

The tendency for competitors to make themselves identical to appeal to the maximum number of clients or voters.

## 9.1 PUBLIC GOODS

### ■ The Role of Bureaucrats

Bureaucrats translate the choices of politicians into programs and control the day-to-day activities that deliver public goods.

The behavior of bureaucrats modifies the political outcome.

### ■ Rational Ignorance

The decision not to acquire information because the marginal cost of doing so exceeds the expected marginal benefit.

## 9.1 PUBLIC GOODS

### ■ Why Government Is Large and Grows

Government grows in part because the demand for some public goods increases at a faster rate than the demand for private goods.

Two possible reasons are:

- Voter preferences
- Inefficient overprovision

## 9.1 PUBLIC GOODS

### Voter Preferences

As voters' incomes increase, the demand for many public goods increases more quickly than income. These goods include:

- Highways; air-traffic control systems; public health; education; and national defense.

### Inefficient Overprovision

- The goal of budget maximization combined with voters' rational ignorance might explain the expanding government budgets.

## 9.1 PUBLIC GOODS

### ■ Voter Backlash

A backlash against government programs might force politicians of all parties to embrace smaller and leaner government.

Privatization of the production of public goods might also counter the tendency for government budgets to grow.

## 9.2 THE TAX SYSTEM

Taxes generate financial resources that governments use to provide public goods and redistribute income.

Governments use five types of taxes:

- Income taxes
- Social security taxes
- Sales taxes
- Property taxes
- Excise tax

## 9.2 THE TAX SYSTEM

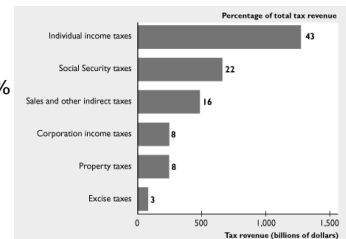
Figure 9.5 shows the sources of tax revenues:

Income taxes 51% (43% personal and 8% corporate)

Social Security taxes 22%

Property taxes 8%

Excise taxes 3%



## 9.2 THE TAX SYSTEM

### Income Taxes

In 2000, the personal income tax raised:

- \$1 trillion for the federal government
- \$270 billion for state and local governments

Corporate profits taxes raised:

- \$207 billion for the federal government
- \$41 billion for the state governments

## 9.2 THE TAX SYSTEM

### Personal Income Tax

#### Taxable income

Total income minus personal exemption and a standard deduction or other allowable deductions.

#### Marginal tax rate

The percentage of an additional dollar of income that is paid in tax.

## 9.2 THE TAX SYSTEM

#### Average tax rate

The percentage of income that is paid in tax.

#### Progressive tax

An increase in the average tax rate as income increases.

#### Proportional tax

A constant average tax rate at all income levels.

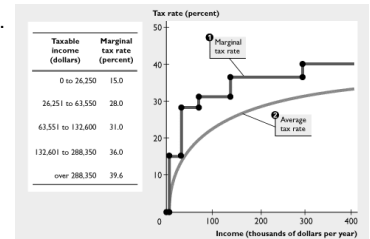
#### Regressive tax

A decrease in the average tax rate as income increases.

## 9.2 THE TAX SYSTEM

Figure 9.6 shows U.S. tax rates in 2000.

1. Marginal tax rate increases with income.
2. Average tax rate increases with income, but is less than the marginal rate.



## 9.2 THE TAX SYSTEM

### ■ The Effects of Income Taxes

#### Taxes on Labor Income

Taxes on labor income lead to:

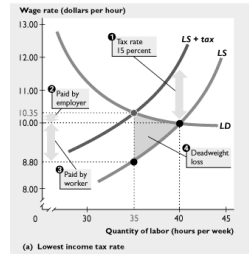
- Unemployment, which is greater among low-wage workers than among high-wage workers.
- A deadweight loss, which is larger for high-wage workers than for low-wage workers.

## 9.2 THE TAX SYSTEM

Figure 9.7(a) shows the effect of a tax on low-wage workers.

With a 15% income tax:

1. The supply of labor decreases, the wage rate rises, and the after-tax wage rate falls.
2. The employer pays some of the tax.
3. The worker pays most of the tax.
4. A deadweight loss arises.

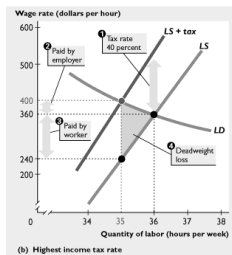


## 9.2 THE TAX SYSTEM

Figure 9.7(b) shows the effect of a tax on high-wage workers.

With a 40% tax:

1. The supply of labor decreases, the wage rate rises, and the after-tax wage rate falls.
2. The employer pays some of the tax.
3. The worker pays most of the tax.
4. A deadweight loss arises.



## 9.2 THE TAX SYSTEM

### Taxes on Capital Income

Taxing the income from capital works like taxing the income from labor.

One crucial difference: capital is internationally mobile and so its supply is highly elastic.



## 9.2 THE TAX SYSTEM

Table 9.1 sets out marginal tax rates for personal incomes in the United States in 2000.

TABLE 9.1 U.S. PERSONAL INCOME TAX RATES IN 2000

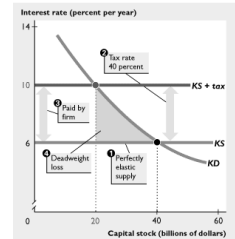
Taxable income	Marginal tax rate
\$0 to \$26,250	15.0 percent
\$26,251 to \$63,550	28.0 percent
\$63,551 to \$132,600	31.0 percent
\$132,601 to \$288,350	36.0 percent
Over \$288,350	39.6 percent

These tax rates incorporate all sources of personal income.

## 9.2 THE TAX SYSTEM

Figure 9.8 shows the effect of a tax on capital income.

1. The supply of capital is perfectly elastic.
2. With a 40 percent tax on capital income, the interest rate rises.
3. The firm pays the entire tax.
4. A large deadweight loss arises.



## 9.2 THE TAX SYSTEM

### Taxes on Land and Other Unique Resources

Works in the same way as taxing the income from other sources except for one crucial difference.

The supply of land is highly inelastic.

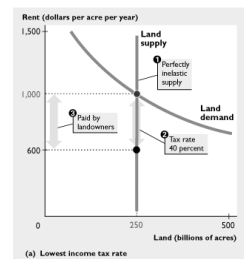
The tax on land income is fully borne by the landowners and the quantity of land is unaffected by the tax.

With no change in the quantity of land, the tax on land income creates no deadweight loss or excess burden and is efficient.

## 9.2 THE TAX SYSTEM

Figure 9.9(a) shows a tax on land.

1. Supply is perfectly inelastic.
2. With a 40 percent tax, the supply curve is unchanged and the market price is unchanged.
3. The landowner pays the entire tax.



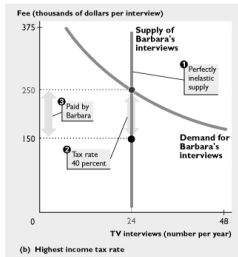
No deadweight loss arises—the tax is efficient.

## 9.2 THE TAX SYSTEM

Figure 9.9 (b) shows a high tax rate on Barbara Walter's income.

1. Supply is perfectly inelastic.
2. With a 40 percent tax, the supply curve is unchanged and the market price is unchanged.
3. Barbara Walters pays the entire tax.

No deadweight loss arises and the tax is efficient.



## 9.2 THE TAX SYSTEM

### Why We Have a Progressive Income Tax

We have a progressive income tax because a majority of voters support it and so politicians who support it get elected.

The economic model that predicts progressive income taxes is called the median voter model.

## 9.2 THE TAX SYSTEM

### The median voter model

Political parties pursue the policies that are most likely to attract the support of the median voter.

- The median voter is the one in the middle of the range of opinion—one half of the voter population lies on one side and one half on the other.

## 9.2 THE TAX SYSTEM

### ■ Is the Tax System Fair?

Whenever political leaders debate tax issues, it is fairness, not efficiency, that looms above all other considerations.

There are two conflicting principles of fairness of taxes:

- The benefits principle
- The ability-to-pay principle



## 9.2 THE TAX SYSTEM

### **The Benefits Principle**

#### **Benefits principle**

The proposition that people should pay taxes equal to the benefits they receive from public services.

This arrangement is fair because it means that those who benefit most pay the most.

But to implement it, we would need an objective way of measuring each person's marginal benefit from public goods.



## 9.2 THE TAX SYSTEM

### **The Ability-to-Pay Principle**

#### **Ability-to-pay principle**

The proposition that people should pay taxes according to how easily they can bear the burden.

A rich person can more easily bear the burden of providing public goods than a poor person can, so the rich should pay higher taxes than the poor.

This principle compares people according to"

- Horizontal equity
- Vertical equity



## 9.2 THE TAX SYSTEM

### **Horizontal equity**

The requirement that taxpayers with the same ability to pay pay the same taxes.

### **Vertical equity**

The requirement that taxpayers with a greater ability to pay bear a greater share of the taxes.



## 9.2 THE TAX SYSTEM

### **The Marriage Tax Problem**

- In the U.S. tax code, a married couple is considered a single taxpayer.
- This arrangement means that if they each earn the same income as before a marriage, the married couple might pay more tax than they did before marriage.



The End

*Chapter*

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