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# Chapter 10

## ALTERNATIVE MEANS OF GOVERNMENT FINANCE

Public Finance, 10<sup>th</sup> Edition  
David N. Hyman  
Adapted by Chairat Aemkulwat  
for Public Economics 2952331



Chairat Aemkulwat, Public Economics 2952331

## Outline: Chapter 10 ALTERNATIVE MEANS OF GOVERNMENT FINANCE

1. The Purpose and Consequences of Government Finance
2. Principles of Taxation
3. How Should the Burden of Government Finance Be Distributed?
4. Criteria for Evaluating Alternative Methods of Government Finance
5. Alternatives to Taxation
6. Government Enterprise



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# Government Finance

## 1. The Purpose and Consequences of Government Finance

Method of finance can affect many variables, including:

1. The political equilibrium
2. Overall market equilibrium and efficiency with which resources are employed in private uses
3. The distribution of income

# Principles of Taxation

## 2. Principles of Taxation

- *Taxes* – compulsory payments associated with certain activities
- Revenues from taxation
  - 1) used to purchase inputs necessary to produce government-supplied goods and services or
  - 2) used to redistribute purchasing power among citizens
- Reallocates resources from private to government use in two steps:
  1. Ability of individuals to command resources is reduced (reduces income for spending)
  2. Revenues collected used to bid for resources necessary to provide government goods and services, plus income support to recipients of government transfers (i.e., Social Security)



# Tax Base

2. Principles of Taxation

- *Tax base* – item or economic activity on which the tax is levied
  - Economic bases (most commonly used): income, consumption, wealth
- *General tax* – taxes all components of the economic bases; no exclusions, exemptions, or deductions from the tax base
- *Selective tax* – one that taxes only certain portions of the tax base, or allows exemptions and deductions from general tax base
  - *Excise tax* – tax on manufacture or sale of particular good or service

# Tax Rate Structure

2. Principles of Taxation

- The relationship between tax collected during a given accounting period and the tax base.
- Average tax rate (ATR) is total dollar amount of taxes collected divided by dollar value of taxable base:

$$ATR = \frac{\text{Total Taxes Paid}}{\text{Value of the Tax Base}}$$

- Marginal tax rate (MTR) is additional tax collected as the value of tax base increases by one dollar:

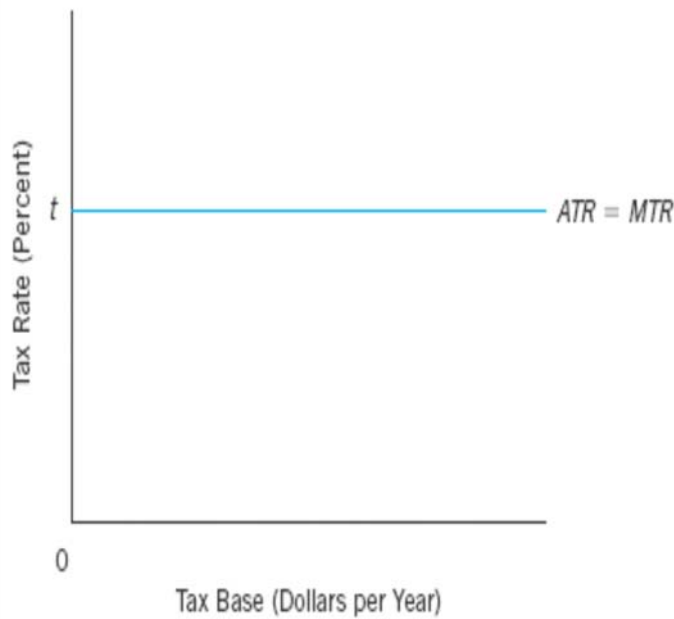
$$MTR = \frac{\Delta \text{ Total Taxes Paid}}{\Delta \text{ Value of the Tax Base}}$$

# Proportional Tax Rate Structure

2. Principles of Taxation

10.1

## Proportional Tax Rate Structure



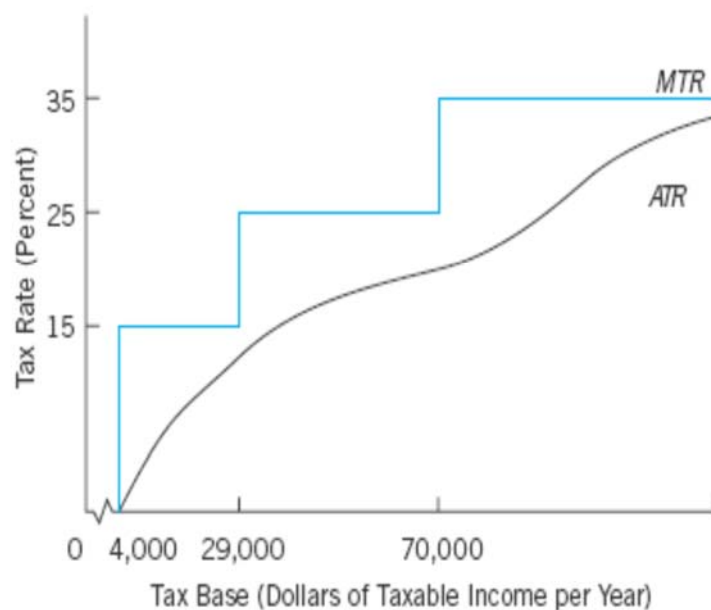
- One for which the ATR, expressed as percentage of value of the tax base, does not vary with value of the tax base:
- The tax base is subject to a flat rate of  $t$  percent at all annual values.
- Under a flat-rate tax, the average tax rate (ATR) is always equal to the marginal tax rate (MTR).

# Progressive Tax Rate Structure

2. Principles of Taxation

10.2

## Progressive Tax Rate Structure



- Under a progressive tax rate structure, the ATR increases with the size of the tax base. The
- MTR exceeds the ATR after a point. These curves are based on Table 10.1.



# Progressive Tax Rate Structure (USA)

2. Principles of Taxation

- One for which the ATR increases with the size of the tax base
- Tax bracket gives incremental annual income associated with each MTR

**TABLE 10.1**

**An Example of a Progressive Tax Rate Structure**

TAX BRACKETS (TAXABLE INCOME)	MARGINAL TAX RATES (MTR)	AVERAGE TAX RATES (ATR)	
		BEGINNING OF BRACKET	END OF BRACKET
0-\$ 4,000	0	0	0
\$ 4,000-\$29,000	15	0	13
\$29,000-\$70,000	25	13	20
Above \$70,000	35	20	34 <sup>a</sup>

<sup>a</sup>Calculated for \$1,000,000 annual income.



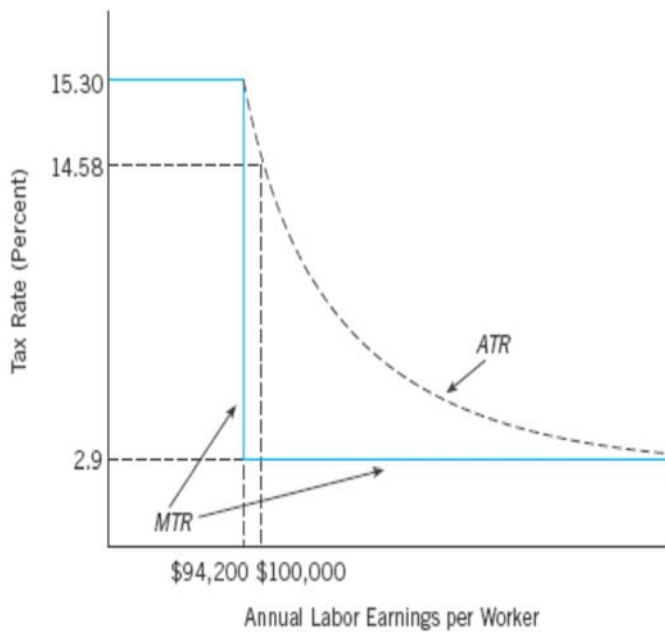
# Progressive Tax Rate Structure (Thailand)

2. Principles of Taxation

TAXABLE INCOME	INCOME	Tax Rate		Total Taxes Paid		
		2004-2011 (B.E. 2547-2555)	2013 (B.E. 2556)	2004-2011 (B.E. 2547-2555)	2013 (B.E. 2556)	Tax Reduction
0-150,000	150,000	exempt	exempt	-	-	-
150,001-300,000	150,000	10%	5%	15,000	7,500	7,500
300,001-500,000	200,000	10%	10%	20,000	20,000	-
500,001-750,000	250,000	20%	15%	50,000	37,500	12,500
750,001-1,000,000	250,000	20%	20%	50,000	50,000	-
1,000,001-2,000,000	1,000,000	30%	25%	300,000	250,000	50,000
2,000,001-4,000,000	2,000,000	30%	30%	600,000	600,000	-
More than 4,000,000	-	37%	35%	Depending on Income		

# Regressive Tax Rate Structure

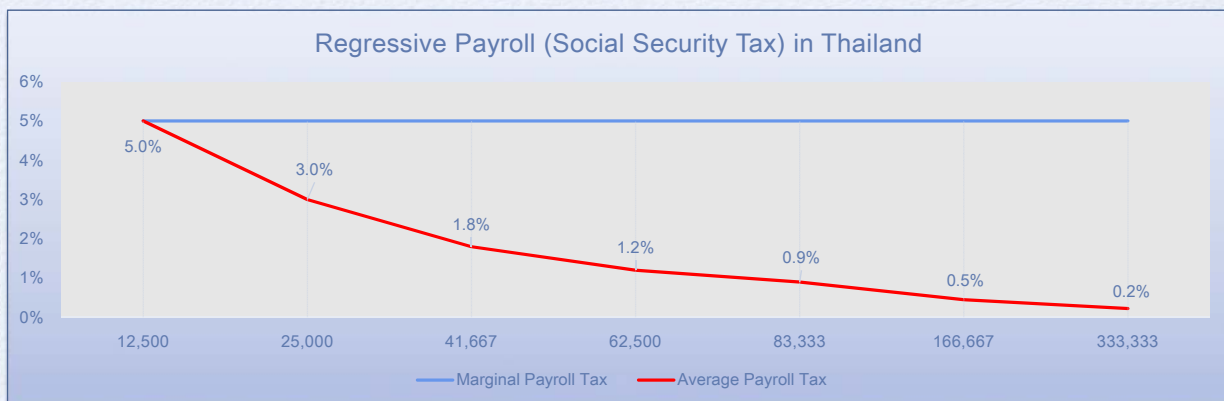
**FIGURE 10.3** Example of a Regressive Tax Rate Structure



- One for which the ATR declines as size of tax base increases; MTR is less than ATR for all those brackets above the lowest
- This is the tax rate structure used for the Social Security payroll tax for 2006.
- It is a two-bracket regressive rate structure.

# Regressive Tax Rate Structure (Thailand)

Person	Income	Marginal Income Tax Rate	Income/month	Tax Base	Payroll Tax	Marginal Payroll Tax	Average Payroll Tax
1	150,000	5%	12,500	12,500	625	5%	5.0%
2	300,000	10%	25,000	15,000	750	5%	3.0%
3	500,000	15%	41,667	15,000	750	5%	1.8%
4	750,000	20%	62,500	15,000	750	5%	1.2%
5	1,000,000	25%	83,333	15,000	750	5%	0.9%
6	2,000,000	30%	166,667	15,000	750	5%	0.5%
7	4,000,000	35%	333,333	15,000	750	5%	0.2%

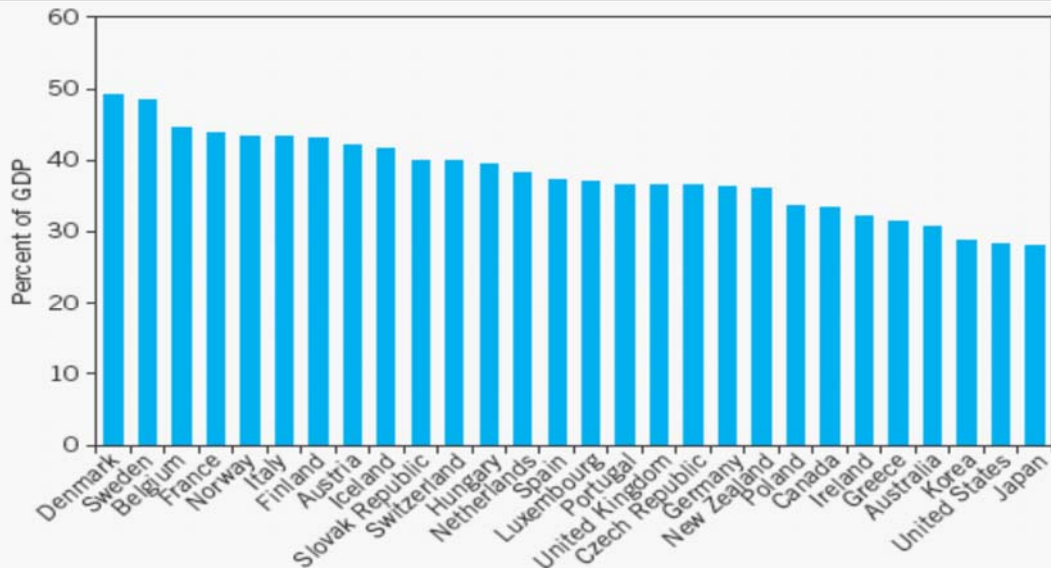




# Average Tax Rate by Nation

2. Principles of Taxation

- Average tax rate by nation measured by revenues as a percent of GDP, 2007



Source: Organization for Economic Cooperation and Development (OECD), 2008, Revenue Statistics 1965–2007.

2. Principles of Taxation

1. A state lottery uses 35% of lottery ticket revenue for prizes, 15% for administrative and retail costs, and 50% of ticket sales revenue for general state government expenditures. Lottery ticket winners are chosen at random through a fair process. Most lottery winners describe the experience of winning as a rags-to-riches change. Is this experience of using a lottery for state revenue regressive, proportional, or progressive? Create a basic example to illustrate your answer.

Ans.

- 1 It is not proportional, because not everyone has to buy a lottery ticket.

Given that most winners tell a story of “rags-to-riches”, this implies that lower income people participate in the lottery more, making it regressive in nature.

- 2 To illustrate the point, a wealthy person with ability has the means to achieve riches and does not need the lottery to gain riches (i.e. does not buy lottery tickets). A poorer person without valuable skills views the lottery as the only means by which they can achieve riches and consequently buys lottery tickets. Since the lottery tax is distributed (through choice) to lower income people more so than higher income, the tax is regressive.

4. The payroll tax for unemployment insurance in a certain nation taxes all wages up to a maximum per worker of \$30,000 at a 5 percent flat rate. What are the marginal and average tax rates on the wages for each of the following three workers?

- a. A restaurant worker with annual wages of \$18,000.
- b. An assistant bank manager with wages of \$35,000 per year.
- c. A corporate CEO with an annual salary of \$500,000.

**Ans.**

- a. The restaurant worker has an average and marginal tax rate of 5 percent.
- b. The average tax rate for the bank manager is  $\$1,500/\$35,000 = 4.29$  percent. The manager's marginal tax rate is zero.
- c. The average tax rate for the CEO is  $\$1,500/\$500,000 = 0.3$  percent. The marginal tax rate for the CEO is zero

6. Suppose you currently earn taxable income of \$100,000 per year. You are subject to an MTR of 50 percent.

- ① Currently, your ATR is 35 percent. Calculate your annual tax.
- ② Calculate the extra tax that you would pay per year if your annual income increased to \$110,000. What is your
- ③ ATR when your annual income is \$110,000?

**Ans.**

- ① Annual tax is \$35,000.
- ② The extra tax on \$10,000 additional income is \$5,000.
- ③ The average tax rate on \$110,000 would be  $\$40,000/\$110,000 = 36.36$  percent.



# Benefit Principle

3. How Should the Burden of Government Finance Be Distributed?

- Argues that the means of financing government-supplied goods and services should be linked to benefits citizens receive from government
  - Fees and charges ideal forms of government finance
- If successfully implemented, links cost per unit of government-provided services with marginal benefits of those services
  - Taxing all according to their marginal benefits results in Lindahl equilibrium (if no free riders)
- However, collectively consumed benefits difficult to assign to individuals
- Sometimes benefits can be correlated with particular economic activity, so that amount taxed paid varies according to benefits received,

# Ability-to-Pay Principle

3. How Should the Burden of Government Finance Be Distributed?

- Maintains that taxes should be distributed according to capacity of taxpayers to pay them
  - Citizens with greater ability to earn income taxed more heavily than those with less capacity to earn
- *Horizontal equity* achieved when those of same economic capacity pay same amount of taxes per year
- *Vertical equity* achieved when those of differing economic ability pay annual tax bills that differ according to some collectively chosen notion of fairness
- Both concepts of equity subjective, difficult to administer

# Evaluating Methods of Government Finance

## 4. Criteria for Evaluating Alternative Methods of Government Finance

System of government finance makes trade-offs among such criteria as:

1. Equity: should coincide with commonly held notions of fairness and ability to pay
2. Efficiency: should raise revenues with minimal loss in efficiency in private sector
3. Simplicity
  - Administrative ease: should be relatively easy to administer in consistent manner without excessive costs to collect, enforce, comply with taxes and tax laws
  - Lower compliance costs – simple tax codes and laws

## Equity Versus Efficiency

### 4. Criteria for Evaluating Alternative Methods of Government Finance

- Because main function of government finance is to reallocate resources from private to government use, government must reduce private consumption and investment to accomplish this.
- Efficiency: Most efficient means of government finance raise level of revenue while minimizing loss in well-being.
- Trade-offs
  - Goals of efficiency and equity in distribution of taxes likely to conflict
  - Trade-off between equitable and efficient system resolved through political interaction
  - Democratic tax systems often full of exemptions and deductions for particular groups



# Tax Compliance and Evasion

4. Criteria for Evaluating Alternative Methods of Government Finance

- *Tax evasion* – noncompliance with tax laws by failing to pay taxes that are due
  - The greater the noncompliance, the higher the tax rates necessary to raise revenues
  - Is illegal
- *Tax avoidance* – a change in behavior to reduce tax liability
  - High taxes on labor income may induce workers to refuse overtime
  - Taking advantage of loopholes in tax code can reduce tax liability
  - Not illegal, but socially wasteful

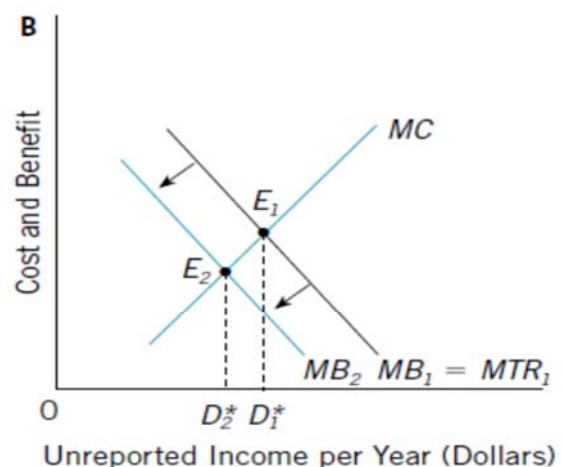
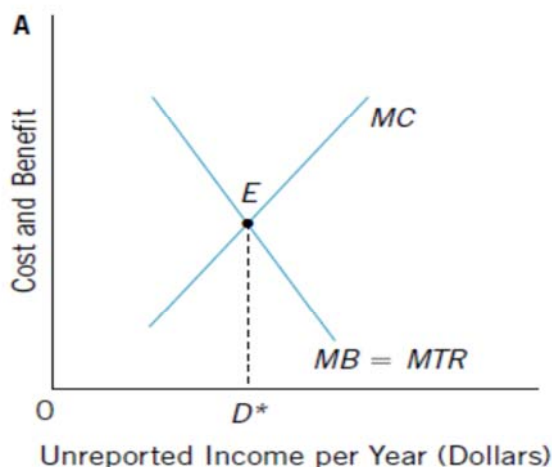
# Reducing Tax Evasion

4. Criteria for Evaluating Alternative Methods of Government Finance

In progressive tax rate structure (say, personal income tax), marginal benefit of dollar of tax evasion declines as more taxable income not reported (as taxpayer moves into lower tax brackets):

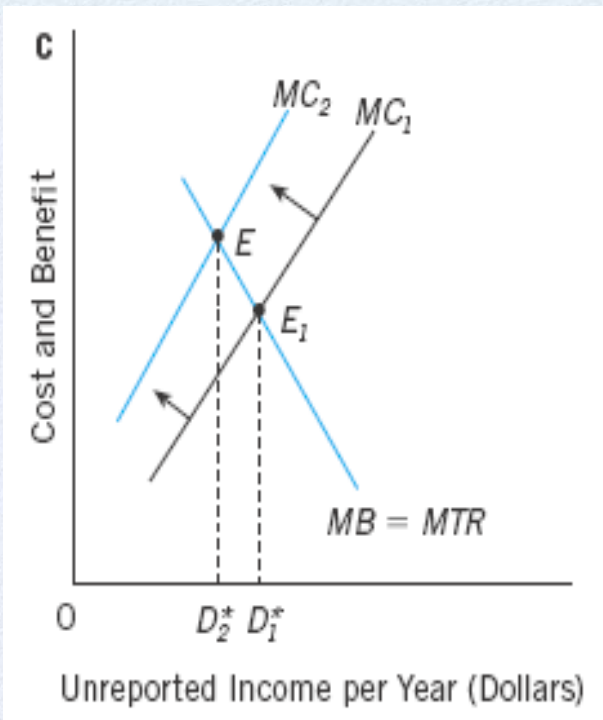
Reduction in MTRs reduces marginal benefit of tax evasion, resulting in downward shift of marginal benefit curve and decrease in unreported income; increasing moral pressure could also shift marginal benefit curve down:

**FIGURE 10.4** Reducing Tax Evasion



# Reducing Tax Evasion

4. Criteria for Evaluating Alternative Methods of Government Finance



- Increases in marginal cost of tax evasion (increasing probability of detection or increase in penalties to those detected) will reduce amount of tax evasion:
- Tax evasion can be reduced either (1) by increasing its marginal cost or (2) by reducing its marginal benefit to taxpayers.

4. Criteria for Evaluating Alternative Methods of Government Finance

3. Indicate how each of the following could impact tax evasion and explain why the effect takes place:

- An increase in MTRs.
- A decrease in MTRs.
- An increase in the complexity of the tax code.
- An increase in the probability that a taxpayer's return will be audited.
- An increase in the penalty for tax evasion

Ans.

a. An increase in marginal tax rates increases incentives for tax evasion by **increasing the marginal benefit** of tax evasion.

b. A decrease in marginal tax rates decreases incentives for tax evasion by **decreasing the marginal benefit** of tax evasion.

c. An increase in the complexity of the tax code makes it more difficult for authorities to determine if evasion is taking place. This probably decreases the marginal cost of tax evasion by decreasing the probability that the evasion will be detected.

d. An increase in the penalty for tax evasion **increases its marginal cost** and decreases the equilibrium amount of evasion.



# Debt Finance

4. Criteria for Evaluating Alternative Methods of Government Finance

- Use of borrowed funds to finance government expenditures
- Lender receives bond, or some other note, that embodies promise of government to repay loan with interest at some future date
  - As debt is paid off, some form of alternate finance is necessary
- Often used to finance capital expenditures made by government authorities.
  - Allows financing of projects with benefits that will accrue in the future without excessive reduction in current purchasing power.

# Government-Induced Inflation

4. Criteria for Evaluating Alternative Methods of Government Finance

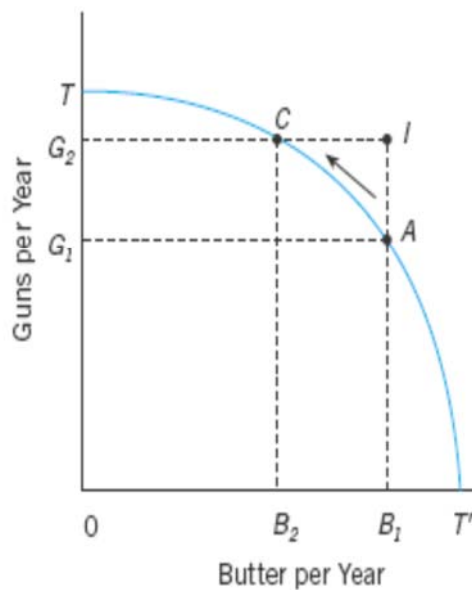
- Sustained annual increase in prices caused by expansion of the money supply to pay for government-supplied goods and services.
- Effect of **such continual increases in money supply** is sustained increases in general level of prices, or inflation.
  - Reduces purchasing power of money held by the public.
  - Can be used only for short periods of time.

# Government-Induced Inflation

4. Criteria for Evaluating Alternative Methods of Government Finance

10.5

## Inflationary Finance



- Using inflation as a way of financing government-supplied goods, such as guns for national defense, is an attempt to increase the output of these goods without decreasing the output of such private goods as butter.
- The government attempts to move to point I, but the increase in the price level decreases consumption of private goods, and the economy actually moves from point A to point C.
- The annual output of butter must decline to release the resources necessary to increase the annual output of guns.

6. Government Enterprise

5. Savings account wealth is owned by the general population more unequally than income wealth. If government prints money to fund expenditures and creates inflation for only one year of 10%, is this inflation tax (seignorage) regressive, proportional, or progressive? Explain. How might your answer change if over the following years, government continues to print even more money, creating a longer term 10% annual inflation rate?

**Ans.**

In structure the tax is proportional in that all savings are affected equally.

However, an argument can be made that the wealthier have more savings making their tax burden heavier than the less wealthy (who have less savings).

From this viewpoint, the tax is progressive. If the tax is continued, the progressive viewpoint becomes more prominent.



# Donations

5. Alternatives to Taxation

- Voluntary contributions to governments from individuals or organizations
- Occasionally used to finance particular programs
  - Aid to victims of natural disasters
  - Contribution of materials and/or time to a war effort
- In communities (where individuals have common tastes or goals), voluntary contributions may be good means of finance; effectiveness diminishes as diversity of preference or population increases

# User Charges

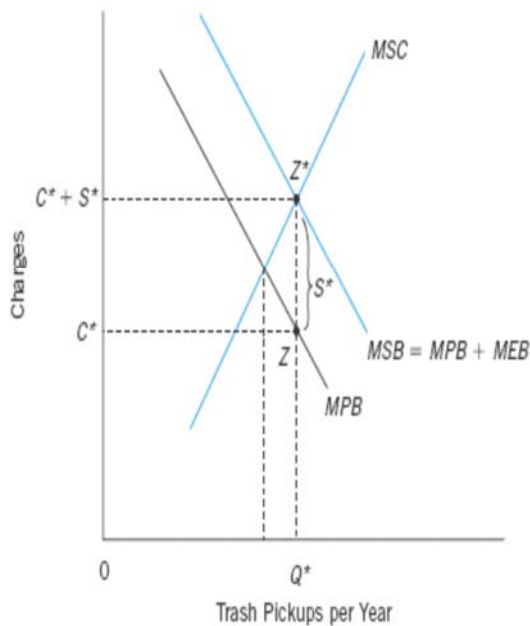
5. Alternatives to Taxation

- Prices determined through political rather than market interaction
  - Direct prices associated with consumption of particular goods and services
  - Fees for using certain government facilities or services
  - Special assessments on private property
  - Licenses or franchises
  - Fares or tolls
- *Earmarked taxes* – special taxes designed to finance specific government-supplied services; similar to user charges
  - Gasoline tax (in the US, not Thailand).
  - Health Tax for Thai Health Promotion Foundation (2% of excise tax on sin products)
  - TV Tax for Thai PBS (1.5% of excise tax on sin products)

# User Charges

5. Alternatives to Taxation

**FIGURE 10.6** User Charges and Efficiency



- Determining appropriate user charge for government-supplied good or service with **external benefits** similar to that of determining a corrective subsidy:
- The efficient user charge is  $C^*$  per trash pickup.
- However, because this does not cover the marginal social cost of pickups at the efficient level of  $Q^*$ , a subsidy of  $S^*$  per pickup must be provided by the government and financed by taxes.

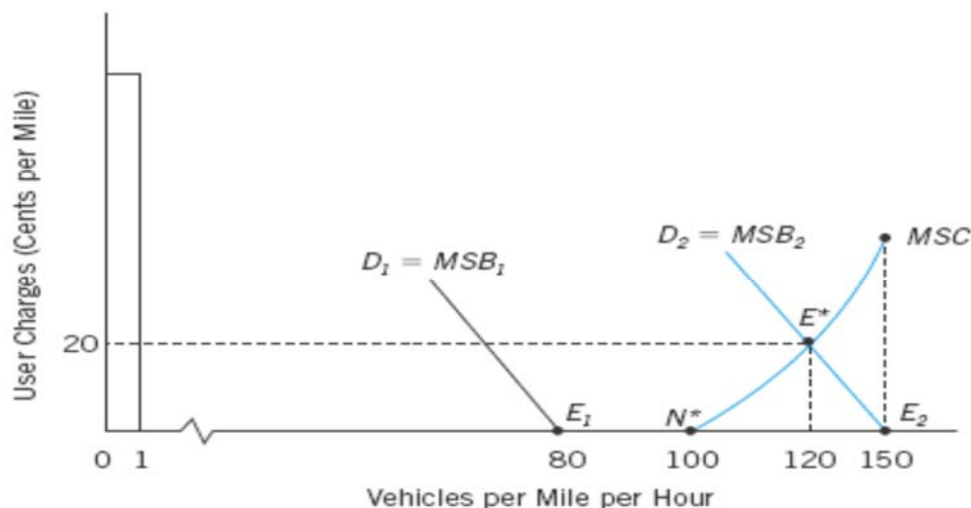
# User Charges

5. Alternatives to Taxation

If the demand for road services is  $D_1$ , the efficient toll is zero. However, if demand increases to  $D_2$ , the efficient toll per mile is 20 cents.

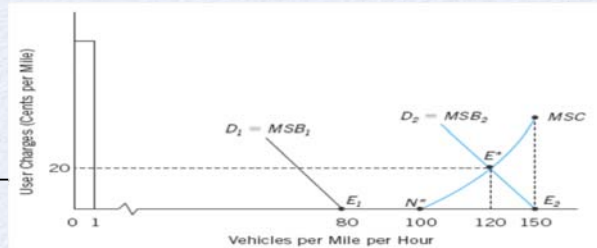
If a zero toll were charged when demand is  $D_2$ , equilibrium would be at point  $E_2$ , at which  $MSC > MSB_2$ .

**FIGURE 10.7** User Charges for a Congestible Government-Supplied Service





7. Indicate whether you agree with the following statement, and give your reasons for doing so: "If the beltline surrounding the city of Raleigh were a pure public good, efficiency would require that the price to use the road be zero. However, during rush hour congestion, the road cannot be regarded as a pure public good and a toll should be charged for its use." If an automated vehicle identification system (AVI) were established for residents of the metropolitan area around Raleigh who use the beltline, how would you set tolls to achieve efficient use of the road? The AVI system would allow you to send a bill to each user of the road each month based on miles traveled on the road and the price you charge, which could vary by time of day.



Ans.

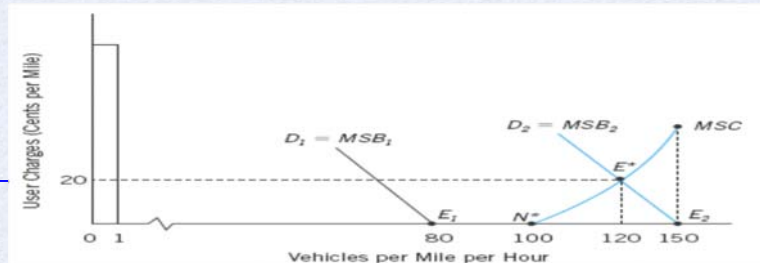
If the marginal cost of entering the road is zero, it is a pure public good and the efficient price is zero.

During rush hours, congestion implies that the marginal cost exceeds zero, and the road is a congestible public good for which a toll should be charged to achieve efficiency. An AVI system should set tolls according to the marginal congestion cost to achieve efficiency.

## 6. Government Enterprise

2. A large city currently provides free water service to residents. The marginal social cost of making a gallon of water available per month is estimated to be 5 cents no matter how much water is used. Currently, city residents consume 500,000 gallons of water per month. The costs of making the water available are financed by a local tax on city residents.

- Draw a graph to show that the current monthly consumption of water is not efficient.
- Show the net gains in well-being possible by applying a user charge of 5 cents per gallon to residential users. Assume that monthly consumption declines to 400,000 gallons after the user charge is imposed. Calculate the tax revenues that can be freed for other uses each month (including a reduction in taxes to local residents) after the user charge is imposed.



Ans.

2a. Because the price is zero, water will be consumed up to the point at which its marginal benefit is zero. At that level of output, the marginal cost will be five cents, so more than the efficient amount of water will be consumed because the marginal cost of water exceeds its marginal benefit.

- The user charge of five cents will reduce quantity demanded until marginal benefit equals five cents. At that level of output, net gains from water production will increase by  $0.5(100,000)5$  cents = \$2,500 per month, which is equal to the welfare triangle. Tax revenues of \$5,000 per month will be freed, because water production will fall by 100,000 gallons per month. In addition, the user charge will collect \$20,000 monthly from the sale of 400,000 gallons of water each month. A total of \$25,000 in tax revenue will therefore be freed as a result of the user charge.

# Government Enterprise

## 6. Government Enterprise

- Governments often sell private goods and services to raise revenues to reduce reliance on taxes:
  - Gambling services such as state lotteries, betting games
  - Retail services such as state liquor stores.
- Normative approach argues that output of public enterprise must be priced at its marginal cost to achieve efficiency.

# State Enterprises in Thailand

## • Natural Monopoly

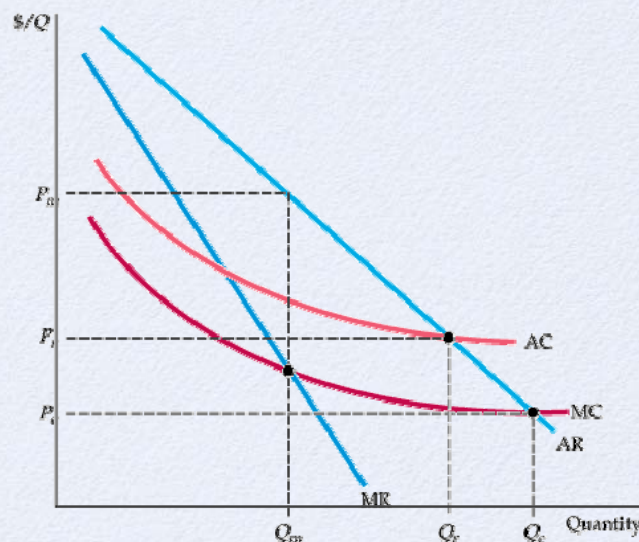
- **natural monopoly** Firm that can produce the entire output of the market at a cost lower than what it would be if there were several firms.

### Regulating the Price of a Natural Monopoly

A firm is a natural monopoly because it has economies of scale (declining average and marginal costs) over its entire output range.

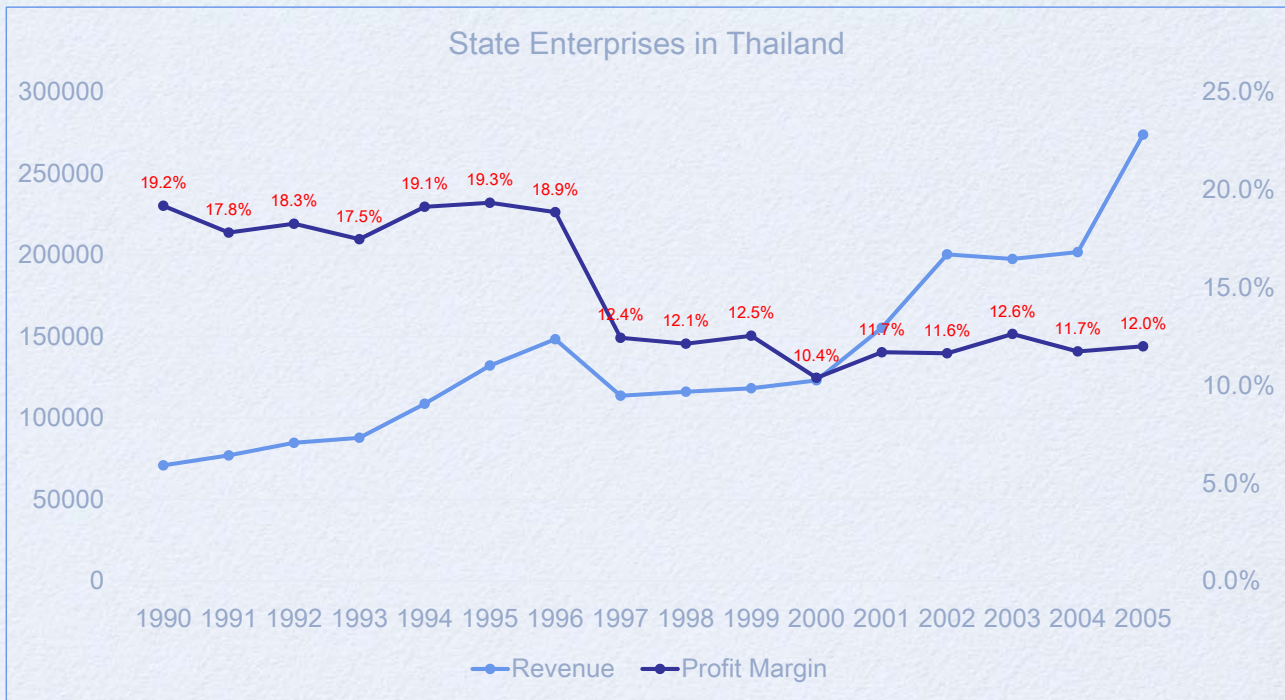
If price were regulated to be  $P_C$  the firm would lose money and go out of business.

Setting the price at  $P_F$  yields the largest possible output consistent with the firm's remaining in business; excess profit is zero.



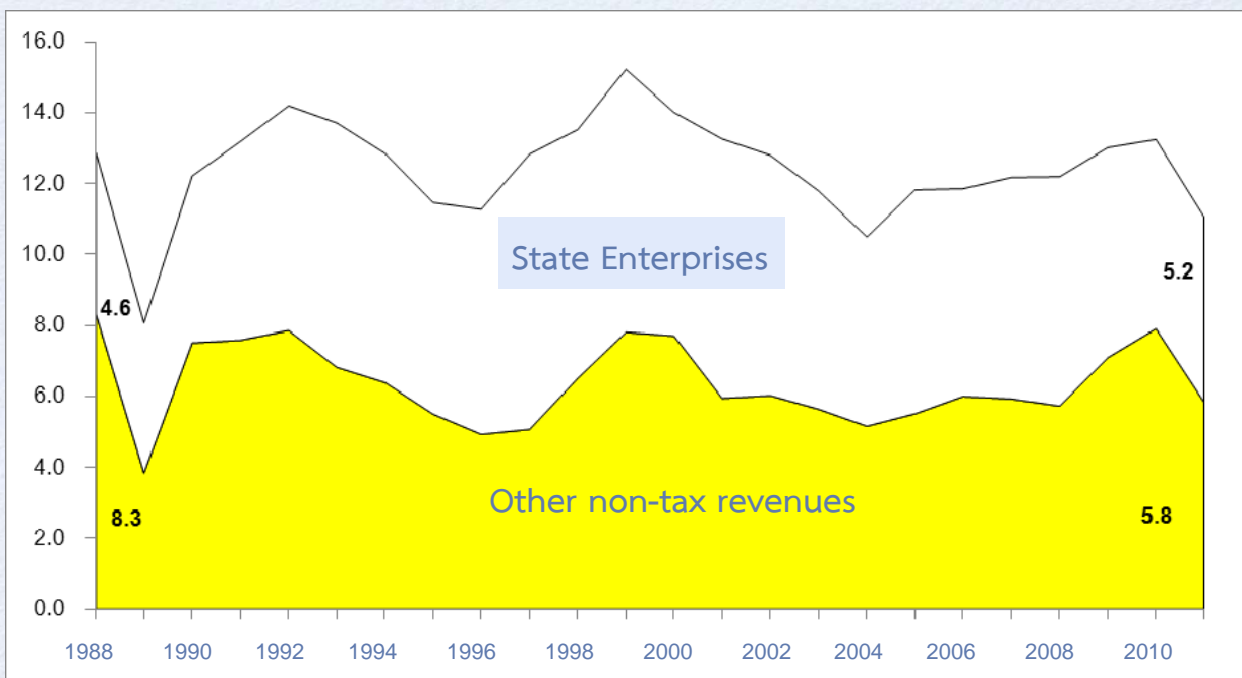


# State Enterprises in Thailand



# State Enterprises in Thailand

Non-tax Revenue 1988-2010



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