

# Lecture Notes 4

EC1101E Summary Notes

September 5, 2023

## 1. Government Intervention

### 1.0 Concepts

1. **Price ceiling:** A legal maximum on the price of a good or service, e.g., rent control.
2. **Price floor:** A legal minimum on the price of a good or service, e.g., minimum wage.
3. **Tax:** Payment by buyers/sellers to the government on each unit bought or sold.
4. **Subsidy:** Payment by the government to buyers/sellers on each unit bought or sold.
5. Use the **supply and demand model** to assess how each policy affects the market outcome:
  - the price buyers pay
  - the price sellers receive
  - the equilibrium quantity

### 1.1 Price Ceilings

1. A price ceiling above the equilibrium price is **not binding** — it has no effect on the market outcome.
2. The equilibrium price is above the price ceiling and therefore **illegal**.  
The price ceiling is a **binding** constraint on the price, and causes a **shortage**.
3. A price ceiling may result in a **black market**, where goods are sold illegally at prices above the legal ceiling, and typically above the original equilibrium price.

### 1.2 Price Floors

1. A price floor below the equilibrium price is **not binding** — it has no effect on the market outcome.
2. The equilibrium price is below the price floor and therefore **illegal**.  
The price floor is a **binding** constraint on the price, and causes a **surplus**.

### 1.3 Taxes

#### 1.3.0 Basic Concepts

1. The government levies taxes on goods and services to raise revenue to pay for national defense, public schools, etc.
2. The government can make buyers or sellers pay the tax.
3. The tax can be a percent of the good's price, or a specific amount for each unit sold.
4. For simplicity, we analyze per-unit taxes only.
5. A tax on buyers shifts the D curve down by the amount of the tax.  
A tax on sellers shifts the S curve up by the amount of the tax.
6. The effects on P and Q and the tax incidence are the same whether the tax is imposed on buyers or sellers.

### 1.3.1 Elasticity and Tax Incidence

**Case 1.** Supply is more elastic than demand

It's easier for sellers than for buyers to leave the market. So buyers bear most of the burden of the tax.

**Case 2.** Demand is more elastic than supply

It's easier for buyers than for sellers to leave the market. So sellers bear most of the burden of the tax.

### 1.3.2 Effects of a Tax

1. We apply welfare economics to measure the gains and losses from a tax.
2. We determine consumer surplus (CS), producer surplus (PS), tax revenue, and total surplus with and without the tax.
3. Tax revenue can fund beneficial services (e.g., education, roads, police), so we include it in total surplus.
4.  $C + E$  is called the **deadweight loss (DWL)** of the tax — the fall in total surplus that results from a market distortion such as a tax.
5. The price elasticities of supply and demand determines the size of the DWL.

Without a tax:

$$CS = A + B + C$$

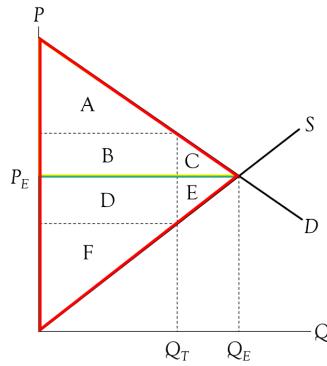
$$PS = D + E + F$$

**Tax Revenue (TR)**

$$= 0$$

**Total Surplus**

$$\begin{aligned} &= CS + PS + TR \\ &= A + B + C \\ &\quad + D + E + F \end{aligned}$$



With a tax:

$$CS = A$$

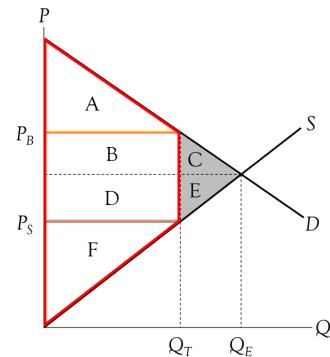
$$PS = F$$

**Tax Revenue (TR)**

$$= B + D$$

**Total Surplus**

$$\begin{aligned} &= CS + PS + TR \\ &= A + B + D + F \end{aligned}$$



The tax reduces total surplus by  $C + E$ .

- 1. When supply is **inelastic**, it's harder for sellers to leave the market when the tax lowers PS. So, the tax only reduces Q a little, and DWL is small.
- 2. When demand is **inelastic**, it's harder for buyers to leave the market when the tax raises PB. So, the tax only reduces Q a little, and DWL is small.
- 1. The more **elastic** the **supply**, the easier it is for sellers to leave the market when the tax lowers PS, the more Q falls below the surplus-maximizing quantity, and the greater the DWL.
- 2. The more **elastic** the **demand**, the easier it is for buyers to leave the market when the tax raises PB, the more Q falls below the surplus-maximizing quantity, and the greater the DWL.

## 1.4 Subsidies

### 1.4.0 Basic Concepts

1. **Government** subsidizes goods and services such as medical care for the poor and elderly, college education, etc.
2. A subsidy to buyers shifts the **D curve up** by the amount of the subsidy.
3. A subsidy to sellers shifts the **S curve down** by the amount of the subsidy.

4. The effects on P and Q and the subsidy incidence are the **same** whether the subsidy is paid to buyers or sellers.

### 1.4.2 The Effects of a Subsidy

Without a subsidy:

$$CS = A + B$$

$$PS = C + D$$

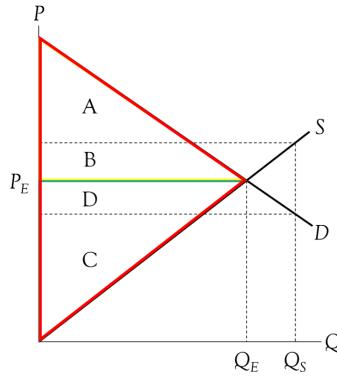
**Subsidy Cost (SC)**

$$= 0$$

**Total Surplus**

$$= CS + PS + SC$$

$$= A + B + C + D$$



With a subsidy:

$$CS = A + B + D + F$$

$$PS = C + D + B + E$$

**Subsidy Cost (SC)**

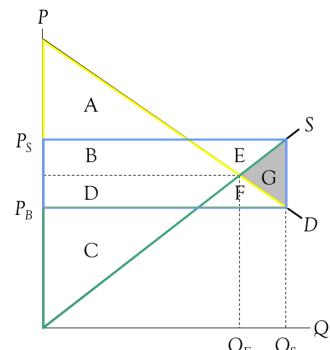
$$= B - E - D - F$$

**Total Surplus**

$$= CS + PS + SC$$

$$= A + B + C + D - G$$

The subsidy reduces total surplus by **G**.



1. G is called the deadweight loss (DWL) of the subsidy — the fall in total surplus that results from a market distortion such as a subsidy.
2. Because of the subsidy, the units between QE and QS are sold. The value of these units to buyers is less than the cost of producing them; the subsidy induces some wasteful trades.