

# EE311 MICROECONOMICS THEORY



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## CHAPTER 1 INTRODUCTION

WHY STUDY  
ECONOMICS?

APPLICATION OF  
DEMAND AND SUPPLY  
CONCEPTS:  
GOVERNMENT  
INTERVENTION

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# References

Besanko &  
Braeutigam (2020),  
ch. 1, 2, 10

Pindyck & Rubinfeld  
(2018) ch. 1, 2, 9

Perloff (2018) ch. 2



# Why study Microeconomics?

Economics is the science that deals with the allocation of **limited resources** to satisfy **unlimited human wants**.

Economics is often described as the *science of constrained choice*.

Fundamental concept

- ❖ Scarcity
- ❖ Resource Allocation
- ❖ Constrained Optimisation
- ❖ Equilibrium
- ❖ Comparative Statics

# Constrained Optimisation (1)

## Scenario:

Suppose a consumer purchases only two goods: food ( $F$ ) and clothing ( $C$ ). The consumer has to **decide how many units of each good to purchase each month**. She wants to maximise her satisfaction with the two goods. Suppose that the level of satisfaction is measured by  $U = FC$ . But she can purchase only limited amount of goods per month because she has a fixed monthly income  $I$  and she must not spend more than  $I$  during the month. Each unit of food costs  $P_F$  and each unit of clothing costs  $P_C$ .

## Questions:

1. What is the objective?
2. What are constraints?
3. Define necessary variables. Which are endogenous? Which are exogenous?
4. Write a statement of the constrained optimisation problem.

# Constrained Optimisation (2)

## Scenario:

A firm produces cellular telephone service using equipment and labour. When it uses  $E$  machine-hours of equipment and hires  $L$  person-hours of labour, it can produce up to  $Q$  units of telephone services. The relationship between  $Q$ ,  $E$ , and  $L$  is as follows:  $Q = \sqrt{EL}$ . The firm must always pay  $P_E$  for each machine-hour of equipment it uses and  $P_L$  for each person-hour of labour it hires. Suppose the production manager is told to produce  $Q = 200$  units of telephone service and that she wants to choose  $E$  and  $L$  to minimise costs while achieving that production target.

## Problems

- ❖ What is the objective function?
- ❖ What are constraints?
- ❖ Define necessary variables. Which are endogenous? Which are exogenous?
- ❖ Write a statement of the constrained optimisation problem.

# Application of Demand & Supply Concepts

- ❖ Concept of Marginal
- ❖ Concept of Elasticities
- ❖ Equilibrium Setting
- ❖ Measurement of Welfare levels
  - ❖ Consumer and producer surplus

# Demand (1)

## ❖ Direct Demand vs Derived Demand

- ❖ Direct Demand: demand for a good that comes from the desire of buyers to directly consume the good itself.
- ❖ Derive Demand: demand for a good that is derived from the production and sale of other goods.

## ❖ Law of Demand:

- ❖ the inverse relationship between the price of a good and the quantity demanded when all other factors that influence demand are held constant (*ceteris paribus*)

## ❖ Willingness to Pay & Ability to Pay

- ❖ An illustration of constrained optimisation

# Demand (2)

Let's work on a demand for new automobiles:

$$Q_d = 5.3 - 0.1P$$

where  $Q_d$  is the number of new automobiles demanded per year (in millions) and  $P$  is the average price of an automobile (in '000 of dollars)

- ❖ Elasticities
  - ❖ Concepts
  - ❖ Measurement
  - ❖ Guideline for Pricing Strategies

# Supply

- ❖ **Law of Supply:**

- ❖ The positive relationship between the price of a good and the quantity supplied when all other factors that influence supply are held constant (*ceteris paribus*)

- ❖ **The Supply Curve** slopes upward, indicating that at higher prices, suppliers of a product are **willing to offer** more for sale than at lower prices.

Let's work on a supply of wheat in Canada:

$$Q_s = 0.15 + P$$

where  $Q_s$  is the quantity of wheat supplied per year (in billions of bushels) and  $P$  is the average price of wheat (in dollars per bushel)

- ❖ **Elasticities: Concepts & Measurement**

# Equilibrium

Concept and how the equilibrium is established

Adjustment towards equilibrium

Equilibrium and Welfare Analyses

Market Equilibrium  $\neq$  Optimal Choice (first best for society)

# Equilibrium

Given linear demand and supply as follows:

Demand:  $Q_d = a - bP$

Supply:  $Q_s = c + dP$

Problems:

- 1) Find equilibrium price and equilibrium quantity.
- 2) Find price elasticity at the equilibrium position.
- 3) What do you learn from the result (1) and (2)?

# Equilibrium and Welfare (1)

## Consumer Surplus (CS)

The difference between the maximum willingness to pay and the actual price paid (graphically indicated by the area between the demand curve and the actual price line)

## Producer Surplus (PS)

The difference between the minimum acceptable price and the price actually received (graphically indicated by the area between the price line and the supply curve.)

## Social welfare

The summation of CS and PS is maximised under the condition of perfect competition.

# Equilibrium and Welfare (2)

## Change in Equilibrium

Market is satisfied;

economy still achieve maximum welfare;

but individuals can be either better off or worse off !

# Correction of Market Failures

In a perfectly competitive market, existence of externalities leads to inefficiency of resource allocation.

Equilibrium does not lead to maximum welfare to Society.

Inefficiency and distortion needs government policy to correct the market failures.

# Government Intervention

- ❖ Taxes and Subsidies
- ❖ Price controls (Price ceilings and Price floors)
- ❖ Tariffs and Quotas
- ❖ Cobweb model

# Imposition of Taxes

Impact on Equilibrium

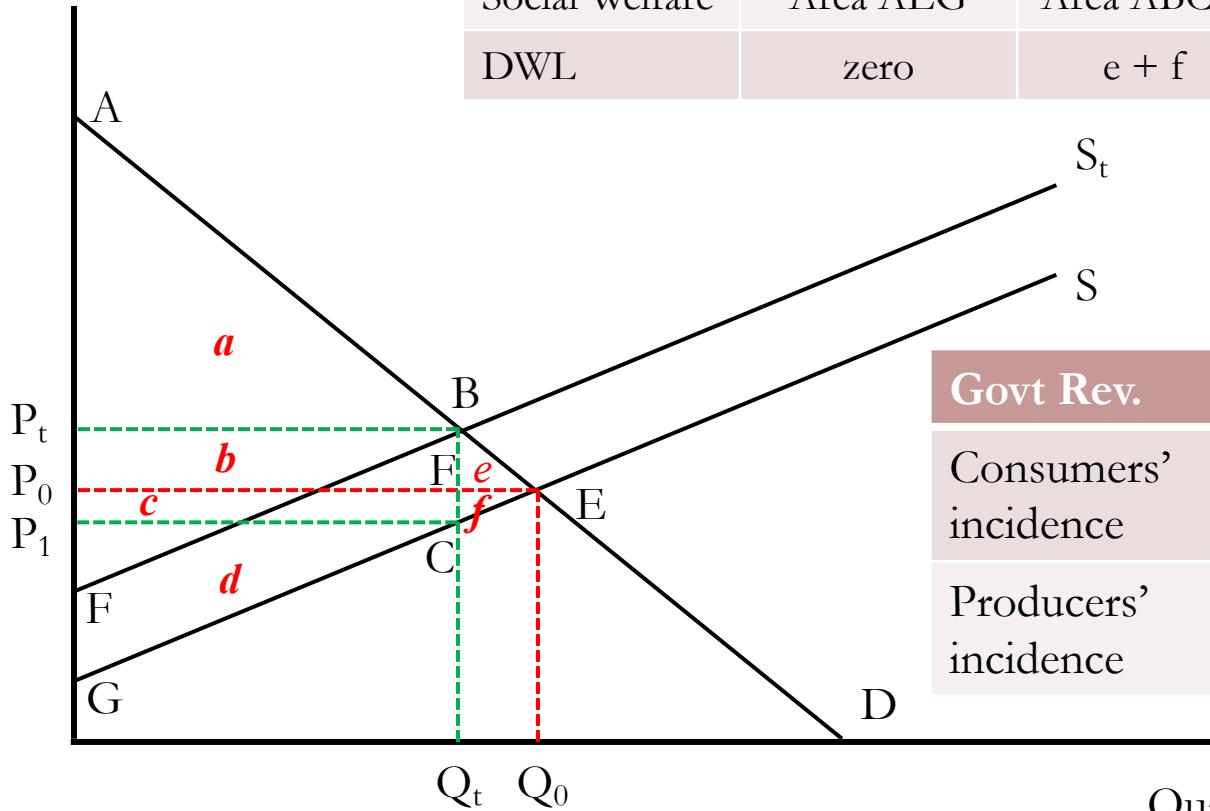
Tax Incidence

Speaking in words !

# Imposition of Taxes

	Without Tax	With Tax	Impact of Tax
Price	$P_0$	$P_t$	$\uparrow$
Quantity	$Q_0$	$Q_1$	$\downarrow$
Govt Rev.	zero	$b + c$	$\uparrow$
CS	$a + b + e$	$a$	$\downarrow$
PS	$d + c + f$	$d$	$\downarrow$
Social Welfare	Area AEG	Area ABCG	$\downarrow$
DWL	zero	$e + f$	$\uparrow$

Price/unit



Govt Rev.	$b + c$
Consumers' incidence	$b$ (increase in expenditure)
Producers' incidence	$c$ (reduction in net revenue)

# Imposition of Taxes

- ❖ **Equilibrium:** higher price and lower quantity
- ❖ **Deadweight loss:** the potential net economic benefit that no one captures when the tax is imposed – neither producers, nor consumers, nor the government.
- ❖ **Tax Incidence (or burden):** the effect that the tax has on the price consumers pay and producers receive in the market.
  - ❖ The distribution of tax incidence depends on relative elasticities of demand and supply.

$$\frac{\Delta P_d}{\Delta P_s} = \frac{e_s}{e_d}$$

# Numerical Illustration

- ❖ A Tax on Gasoline:  $T = 1$  per gallon
  - ❖ Demand:  $Q_d = 209 - 23P$
  - ❖ Supply:  $Q_s = 83 + 19P$
- ❖ Identify equilibrium with and without tax, and assess the impact on welfare changes.

# Self – Assessment

What is meant by the incidence of a tax?

How is the incidence of an excise tax related to the elasticities of supply and demand in a market?

*(from B&B review question 3 ch. 10 p. 461)*

# Subsidies

We can think about a subsidy as a *negative tax*;

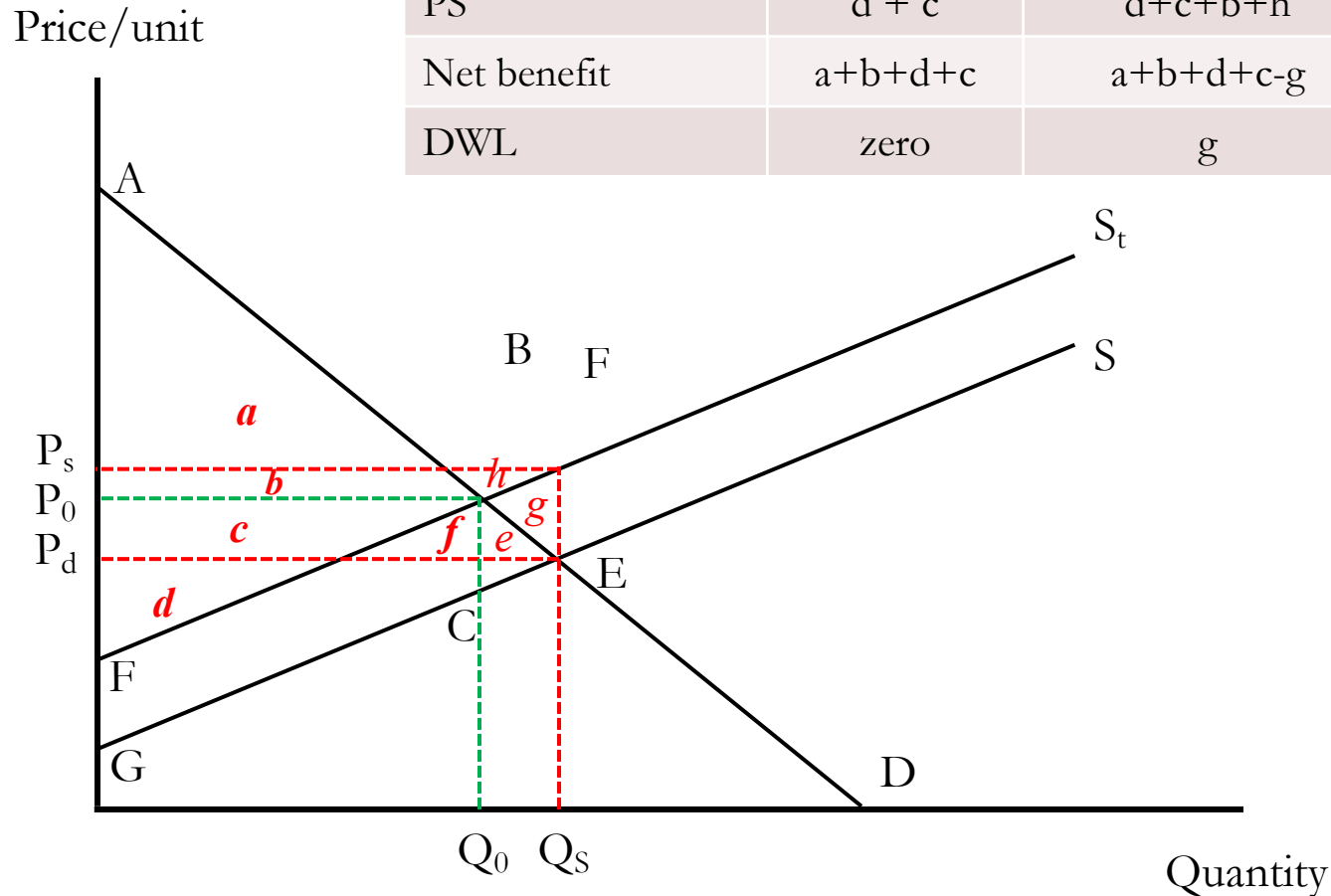
- that is, consumers pay the market price,  $P_d$ , and the government then pays each producer a subsidy of  $S$  per unit on top of the price so that producers will receive after-subsidy price is  $P_d + S$

## Effects of a Subsidy

Like a tax, the benefit of a subsidy is split between buyers and sellers, depending on the relative elasticities of demand and supply.

# Subsidies

	No Subsidy	With Subsidy	Impact of Subsidy
Price	$P_0$	$P_d$	↓
Quantity	$Q_0$	$Q_s$	↑
Govt Spending	zero	$-b-c-f-h-e-g$	↑
CS	$a + b$	$a+b+c+f+e$	↑
PS	$d + c$	$d+c+b+h$	↑
Net benefit	$a+b+d+c$	$a+b+d+c-g$	↓
DWL	zero	$g$	



# Price Ceilings (1)

A legal maximum price that sellers can charge.

They are used to help consumers.

A price ceiling will have no impact when it is set above the equilibrium price.

Examples: Tuition fees, bus fares.

# Price Ceilings (2)

Let's work together on the welfare analyses

# Price Floor (1)

A legal minimum price that sellers can charge.

They are used to help producers

A price floor will have no impact when it is set below the equilibrium price.

Examples: minimum wage, agricultural guaranteed price.

# Price Floor (2)

Let's work together on the welfare analyses

# Production Quota

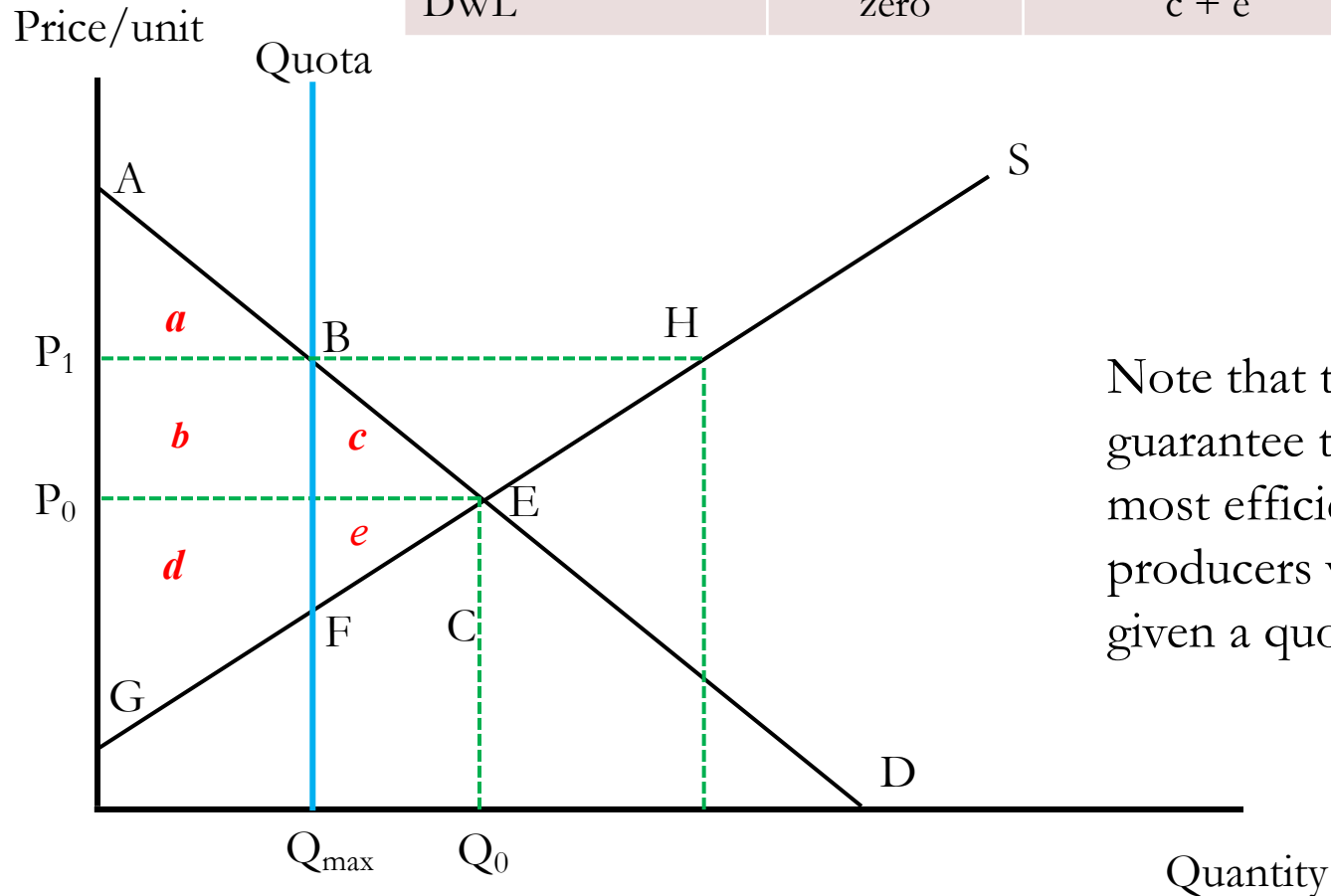
Examples are liquor license, taxi or motorcycle quota

Production Quota is supply restrictions. Entry limit will allow those who have licenses to earn higher prices and profit margins.

With production quota, consumer surplus will be lower than without quota, some of the CS will be transferred to producers, and there will be DWL. Then, **rent-seeking behaviour** will result.

# Production Quota

	No Quota	With Quota	Impact of Quota
Price	$P_0$	$P_1$	↑
Quantity	$Q_0$	$Q_{\max}$	↓
CS	$a + b + c$	$a$	↓
PS	$d + e$	$d + b$	↑
DWL	zero	$c + e$	↑



Note that there is no guarantee that the most efficient producers will be given a quota license.

# Comparing the Impact of Tax, Price Floor and Production Quota

DIY: Let's do comparison on your own.

# Import Tariff

An import tax that is imposed to restrict quantity of import

Let's work in comparison with free trade.

# Import Quota

Unlike production quota, this import quota applies to international trade.

Without domestic production quota, the import quota can still apply if government would like to restrict number of quantity imported.

More details and variety of scenarios are available in EE451.

# Cobweb Model

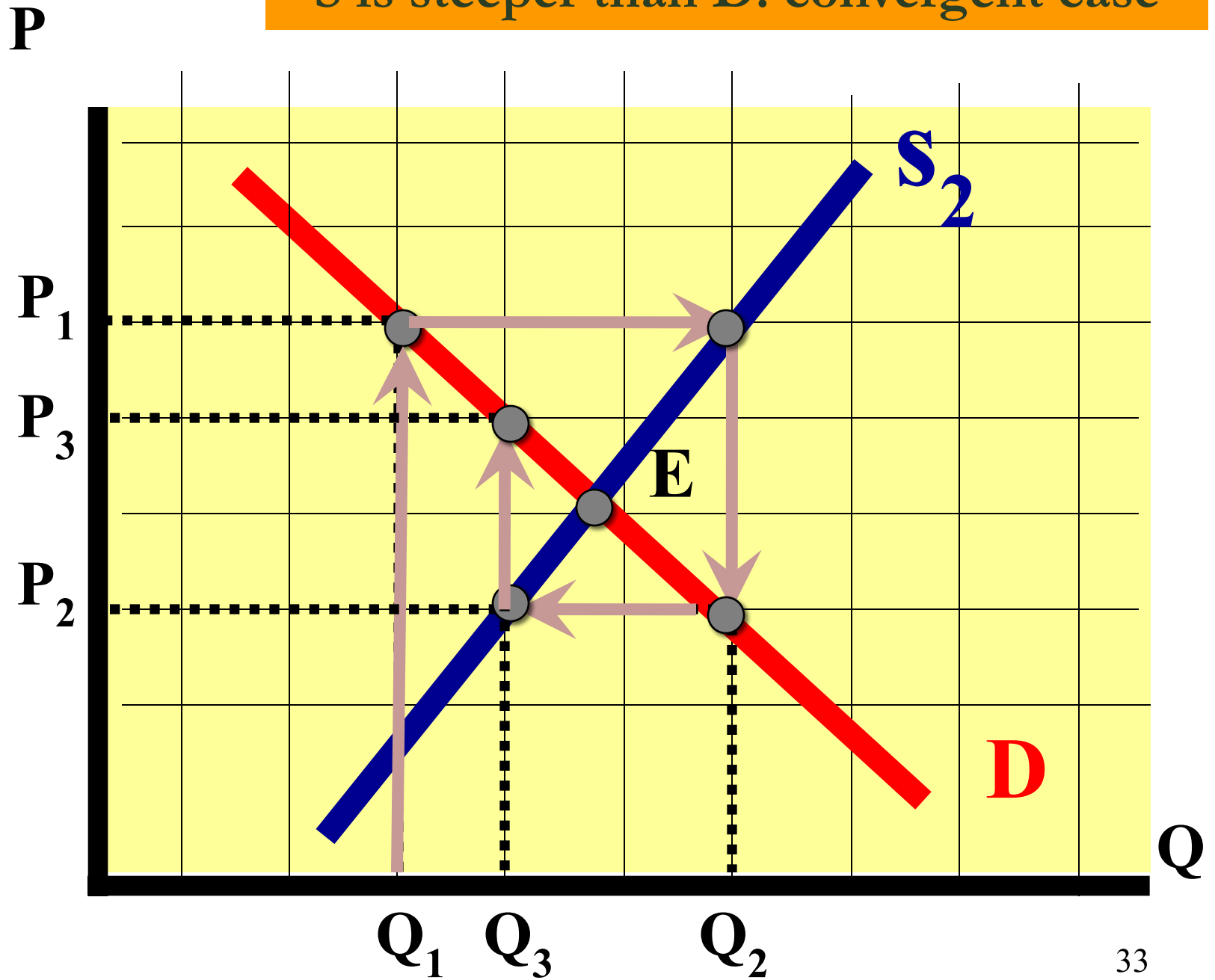
Agricultural products often suffer from cyclical price and output fluctuation.

Cobweb model explains this phenomenon by assuming that farmers need to choose the output level before the actual price is realised.

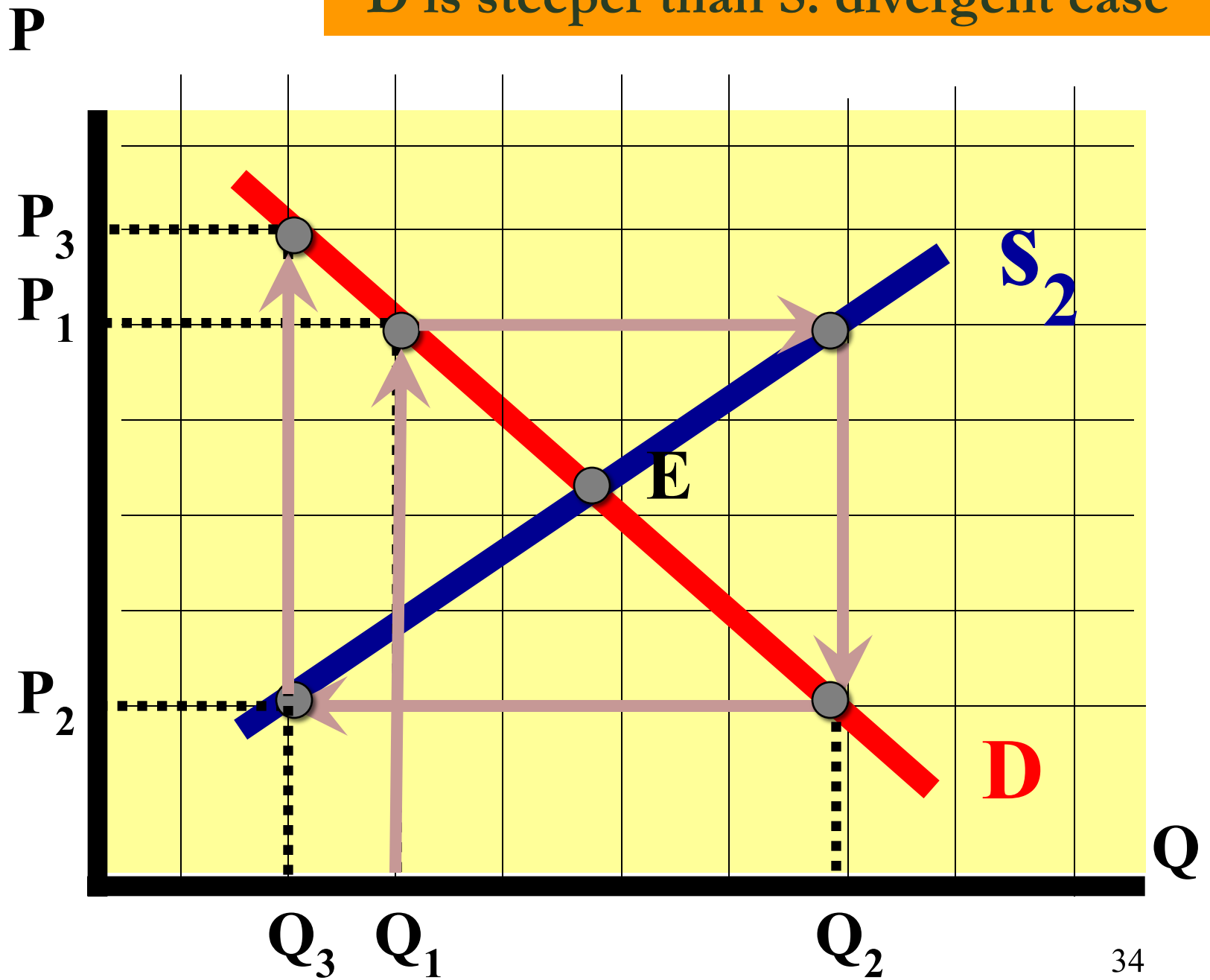
**Farmers use the price in the past to form the expected price in the future. But consumer buy according to the current price.**

The time lag between consumers and farmers causes the fluctuation.

S is steeper than D: convergent case



D is steeper than S: divergent case



# Conclusion (1)

- ❖ Simple D&S model can be used to analyse a wide variety of government policies.
- ❖ Elasticities matter as they can alter magnitude of gains and losses to different stakeholders of the economy.
- ❖ Government intervention generally leads to a deadweight loss; even if CS and PS are weighed equally, there will be a net loss from government policies that shift surplus from one group to another. In other words, it has impact on redistribution of income.

# Conclusion (2)

- ❖ DWL is a form of economic inefficiency that arises when consumers and producers do not capture potential net benefits. So it must be taken into account when policies are designed and implemented.
- ❖ Government intervention in a perfectly competitive market is not always bad, if it was to improve economic efficiencies. Examples are externalities as a case of market failures whereby equilibrium does not enable efficiency.