Elasticity, Supply & Demand, and Government Policy

Microeconomics

Lecture #2

Topics

1. Understanding the concept of elasticity; how supply and demand respond to different levels of price.

2. Calculate and interpret determinants of elasticity.

3. Price control: its impact on producers and consumers.

4. Taxation: the government policy under different elasticities for supply and demand.
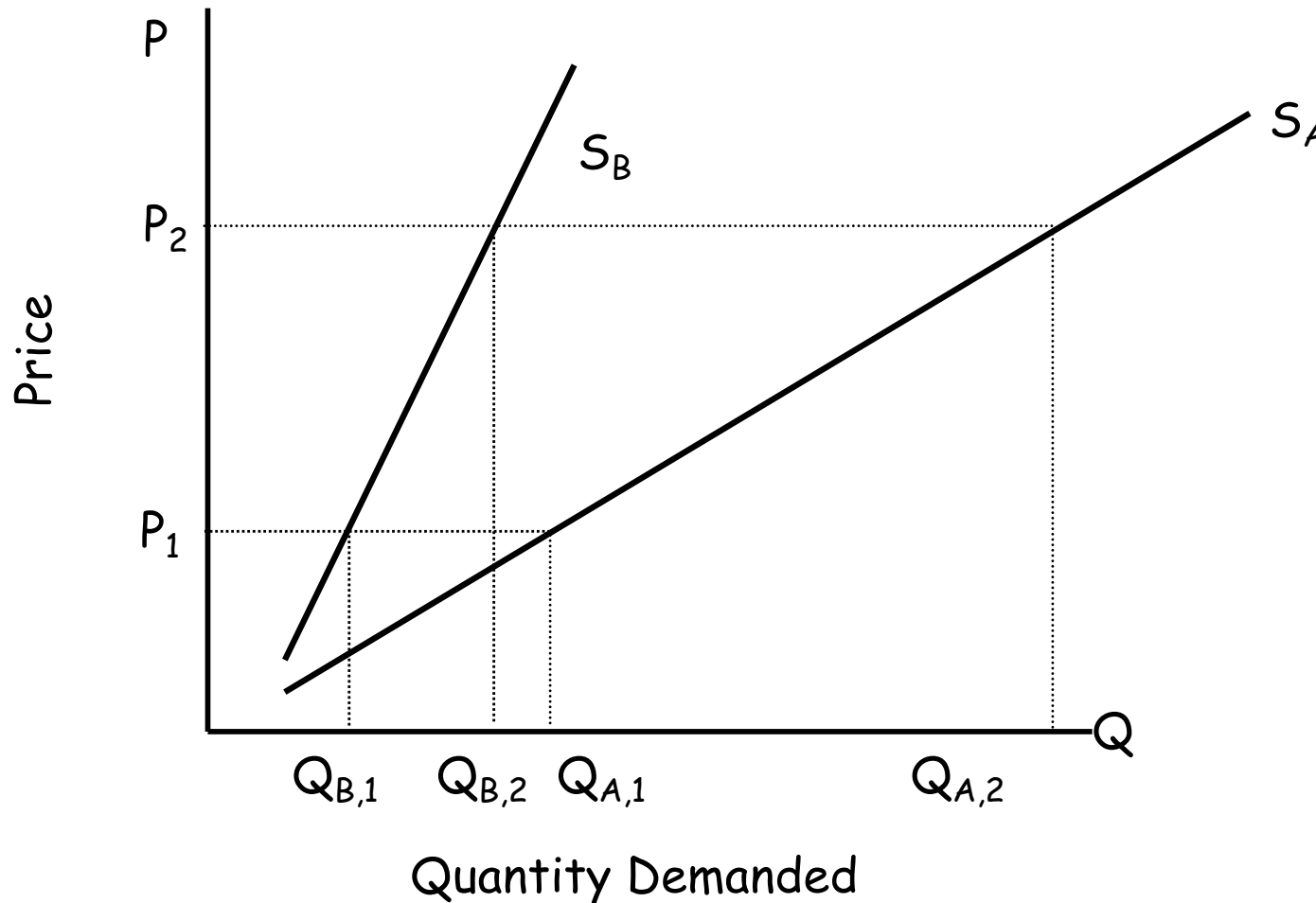
Demand Elasticity

Suppose we have two demand curves that possibly represent the demand behavior of consumers in the Paracetamol market. We don't know which curve is the real demand curve. If the real curve is D_A then the price increase from P_1 to P_2 will cause quantity demanded to drop from $Q_{A,1}$ to $Q_{A,2}$. However, if the real curve is D_B then demand falls from $Q_{B,1}$ to $Q_{B,2}$
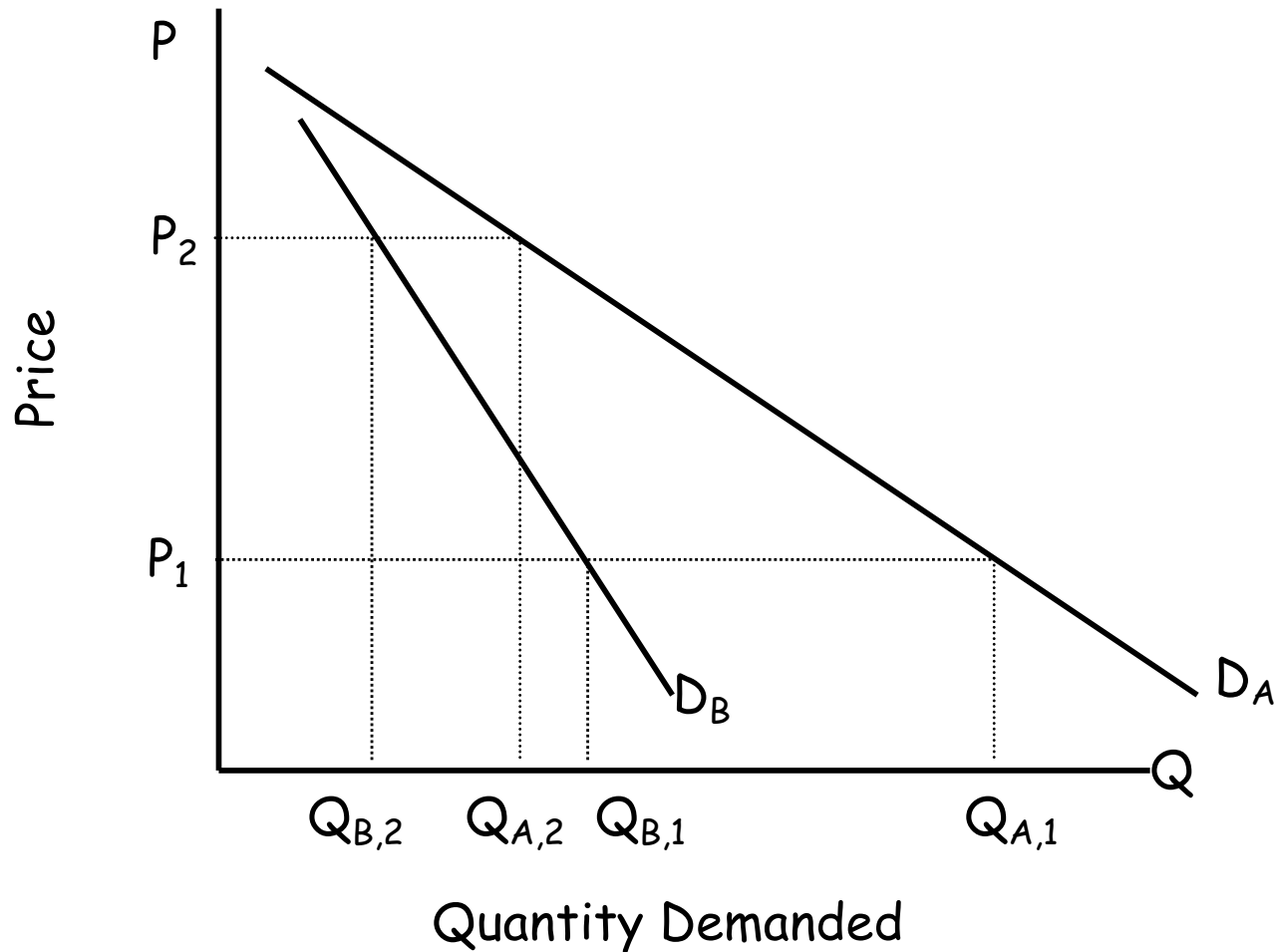
Supply Elasticity

Suppose there are two supply curves possibly represent a firm in the Paracetamol market. If the real curve is S_B then the price increase from P_1 to P_2 will cause quantity supplied to rise from $Q_{B,1}$ to $Q_{B,2}$. However, if the real curve is S_A then the quantity supplied will increase from $Q_{A,1}$ to $Q_{A,2}$. Think what happens to profits if you get it wrong. Either your costs rise faster than your revenues or your revenues do not expand due to increased opportunity.

Price Elasticity: Formula

- Elasticity is defined as the percentage change in Quantity Demanded or Supplied relative to a percentage change in Price.
- The formula for computing an elasticity is to divide the percentage change in price by the percentage change in quantity demanded or supplied:
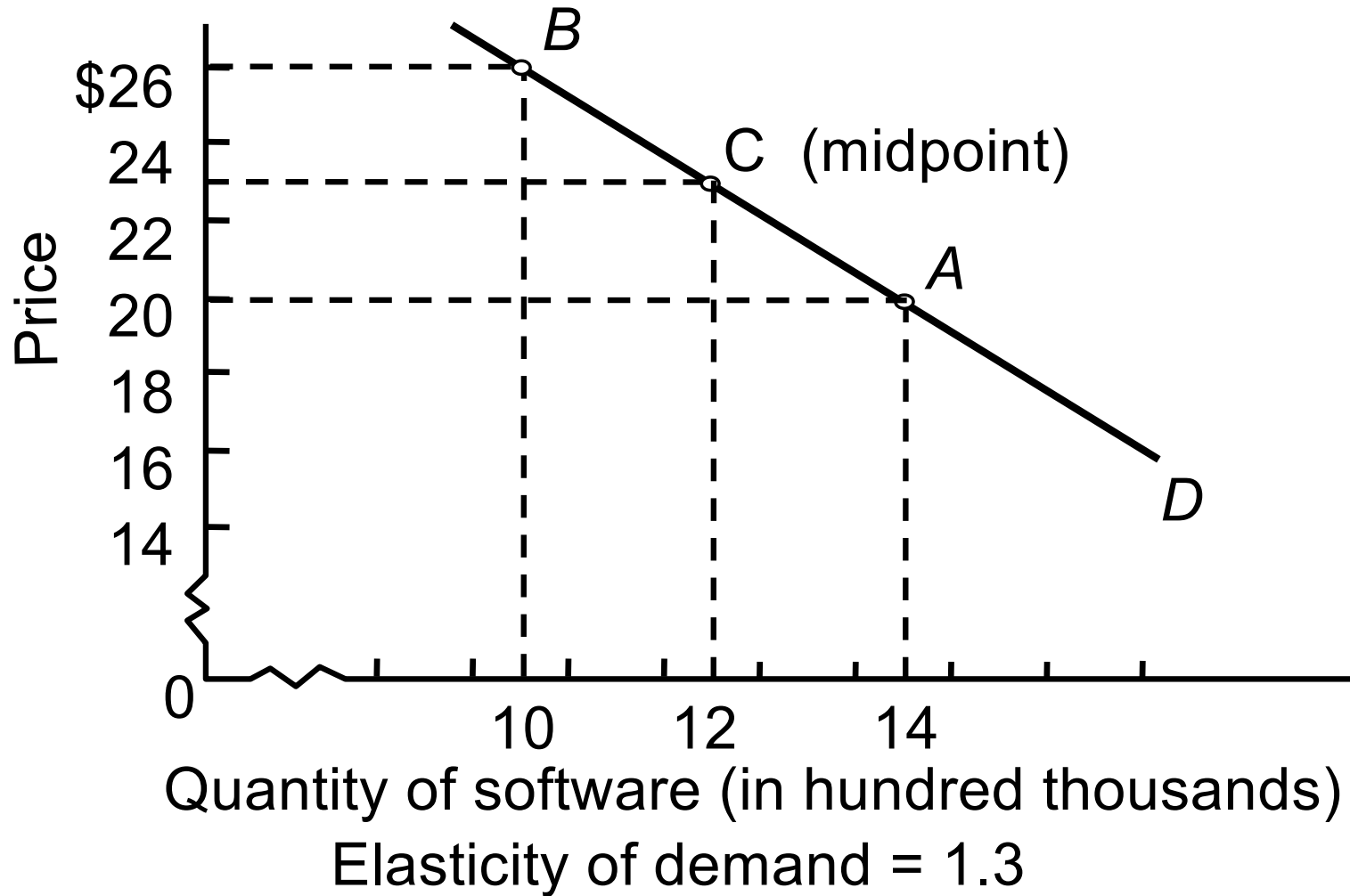
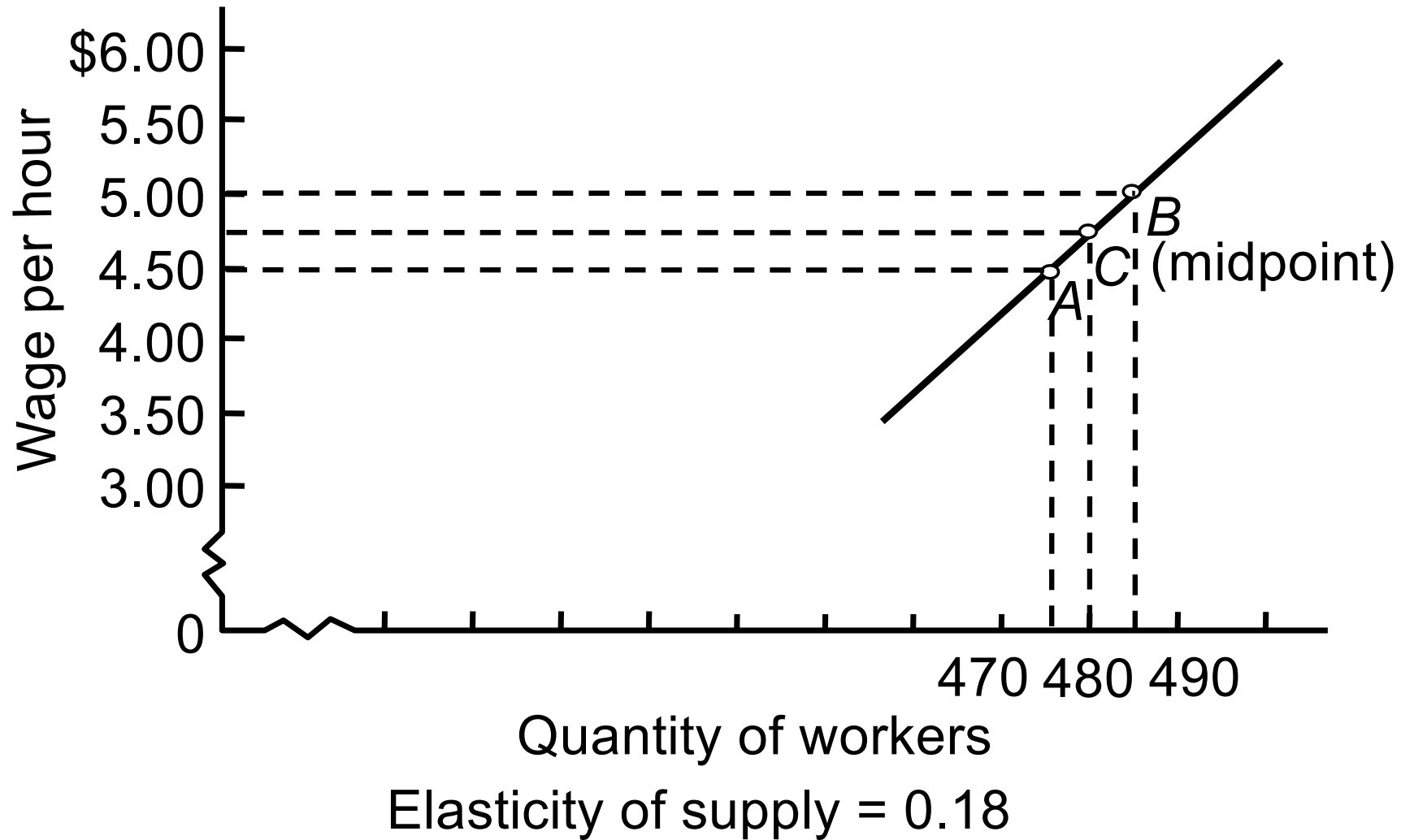$$E = \frac{\%\Delta Q}{\%\Delta P}$$

The Arc Convention

- Using the arc convention, the average of the two end points are used as the starting point when calculating percentage change.

$$Elasticity = \frac{(Q_2 - Q_1) \Big/ \tfrac{1}{2}(Q_2 + Q_1)}{(P_2 - P_1) \Big/ \tfrac{1}{2}(P_1 + P_2)}$$

Graphs of Elasticities

Quantity of software (in hundred thousands)

Elasticity of demand = 1.3

Graphs of Elasticities

Elasticity of supply = 0.18

Calculating Elasticity at a Point

$$E = \dfrac{(28-20)\big/ \tfrac{1}{2}(28+20)}{(5-3)\big/ \tfrac{1}{2}(5+3)} = 0.66$$
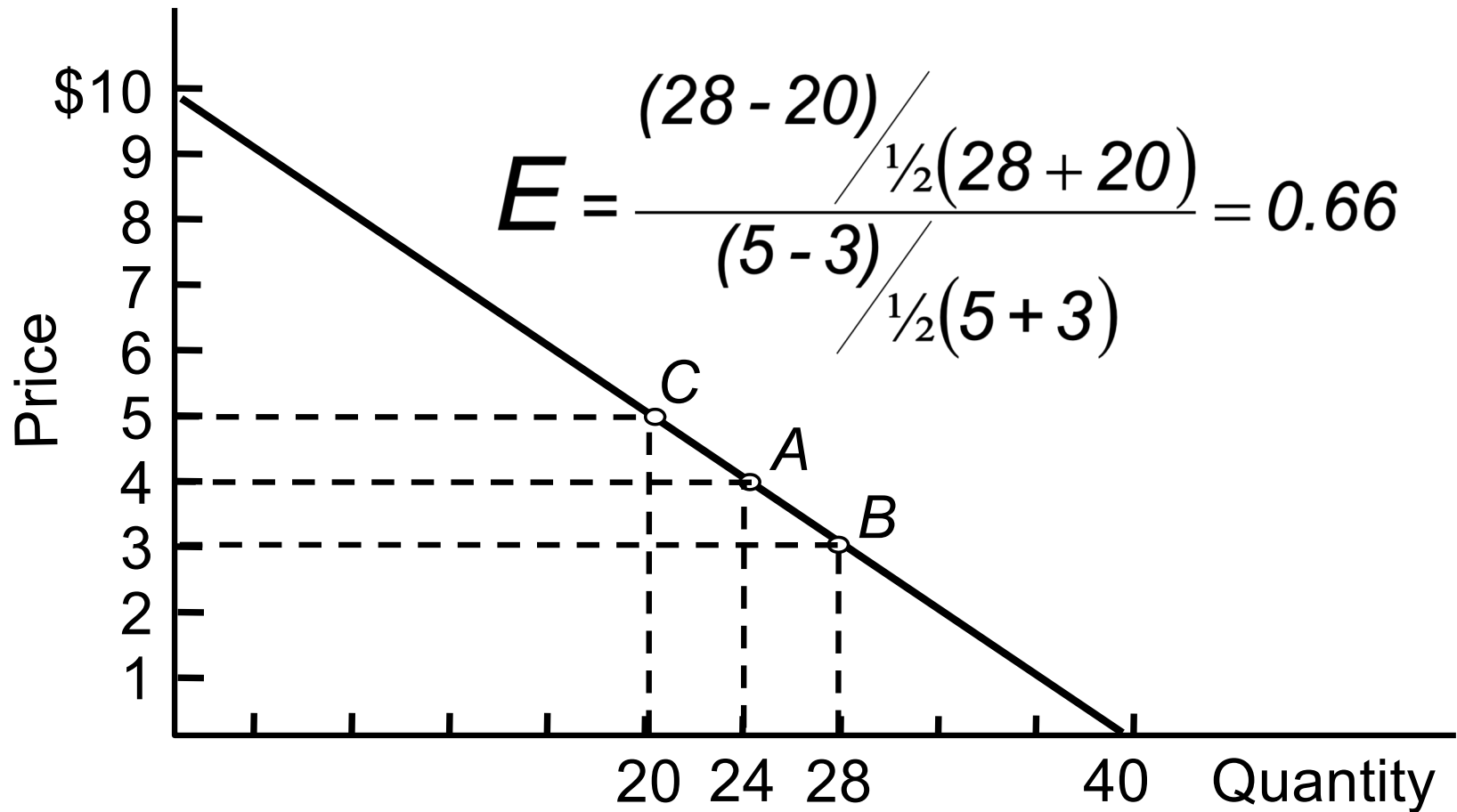
Substitution and Demand

- The larger the time interval considered, or the longer the run, the more elastic is the good's demand curve.

  – There are more substitutes in the long run than in the short run.

  – The long run provides more options for change.

Empirical Estimates of Elasticities

	Price elasticity	
Product	Short Run	Long Run
Tobacco products	0.46	1.89
Electricity (household)	0.13	1.89
Health Services	0.20	0.92
Non-durable toys	0.30	1.02
Movies/motion pictures	0.87	3.67
Beer	0.56	1.39
Wine	0.68	0.84
University tuition	0.52	—

Income Elasticity of Demand

- Income elasticity of demand tells us the responsiveness of demand to changes in income.

- **Income elasticity of demand** is defined as the percentage change in demand divided by the percentage change in income.

$$E_{Income} = \frac{Percentage\ change\ in\ demand}{Percentage\ change\ in\ income}$$

Income Elasticity of Demand

- ***Inferior goods*** are those whose consumption decreases when income increases.

- Inferior goods have income elasticities less than zero.

- Dried cassava is an example of an inferior good.

Income Elasticities of Selected Goods

	Income elasticity	
Product	Short Run	Long Run
Motion pictures	0.81	3.41
Foreign travel	0.24	3.09
Tobacco products	0.21	0.86
Furniture	2.60	0.53
Jewelry and watches	1.00	1.64
Hard liquor	—	2.50
Private university tuition	—	1.10

Cross-Price Elasticity of Demand

- Cross-price elasticity of demand tells us the responsiveness of demand to changes in prices of other goods.

- *Cross-price elasticity of demand* is defined as the percentage change in demand divided by the percentage change in the price of another good.

$$E_{Cross\text{-}Price} = \frac{Percentage\ change\ in\ demand}{Percentage\ change\ in\ price\ of\ another\ good}$$

Complements and Substitutes

- ***Substitutes*** are goods that can be used in place of another.

  - When the price of a good goes up, the demand for the substitute good also goes up.

  - Cross elasticity of substitute goods = 1

Complements and Substitutes

- ***Complements*** are goods that are used in conjunction with other goods.

  - A fall in the price of a good will increase the demand for its complement.

  - The cross-price elasticity of complements is negative.

Cross-Price Elasticities

Commodities	Cross-Price Elasticity
Beef in response to price change in fish	0.11
Beef in response to price change in chicken	0.02
Asian automobiles in response to price changes in European and U.S. automobiles	0.28
European automobiles in response to price changes in U.S. and Asian automobiles	0.61
Tea in response to changes in coffee	0.23
Hard liquor in response to price changes in beer	- 0.11

Effects of Shifts in Supply on Price and Quantity

Inelastic Supply and Elastic Demand
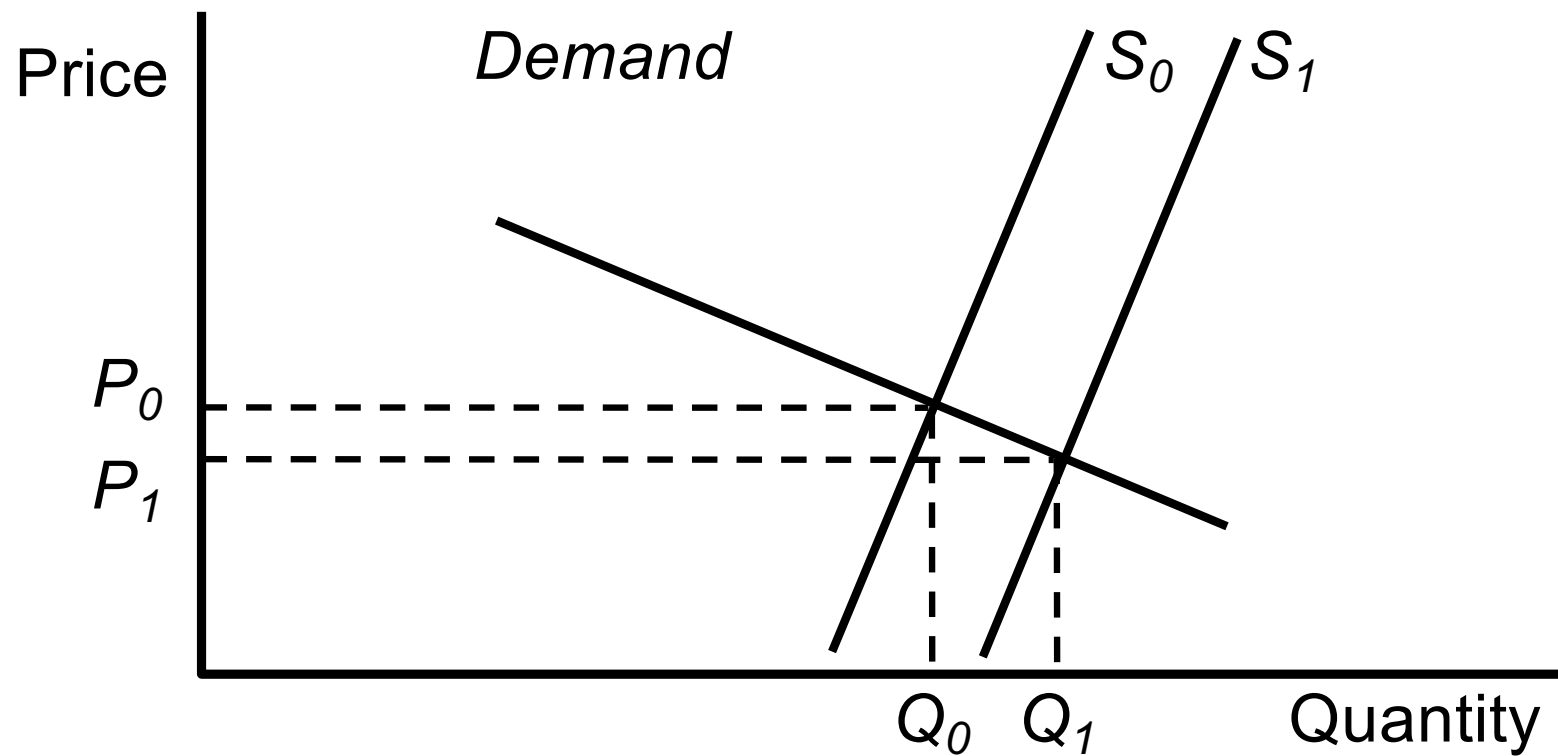
Determinants of Elasticity

- **Time period** – the longer the time under consideration the more elastic a good is likely to be.

- **Number and closeness of substitutes** – the greater the number of substitutes, the more elastic.

- **The proportion of income taken up by the product** – the smaller the proportion the more inelastic.

- **Luxury or Necessity** - for example, addictive drugs.

Importance of Elasticity

- Relationship between changes in price and total revenue.

- Importance in determining what goods to tax (tax revenue).

- Importance in analysing time lags in production.
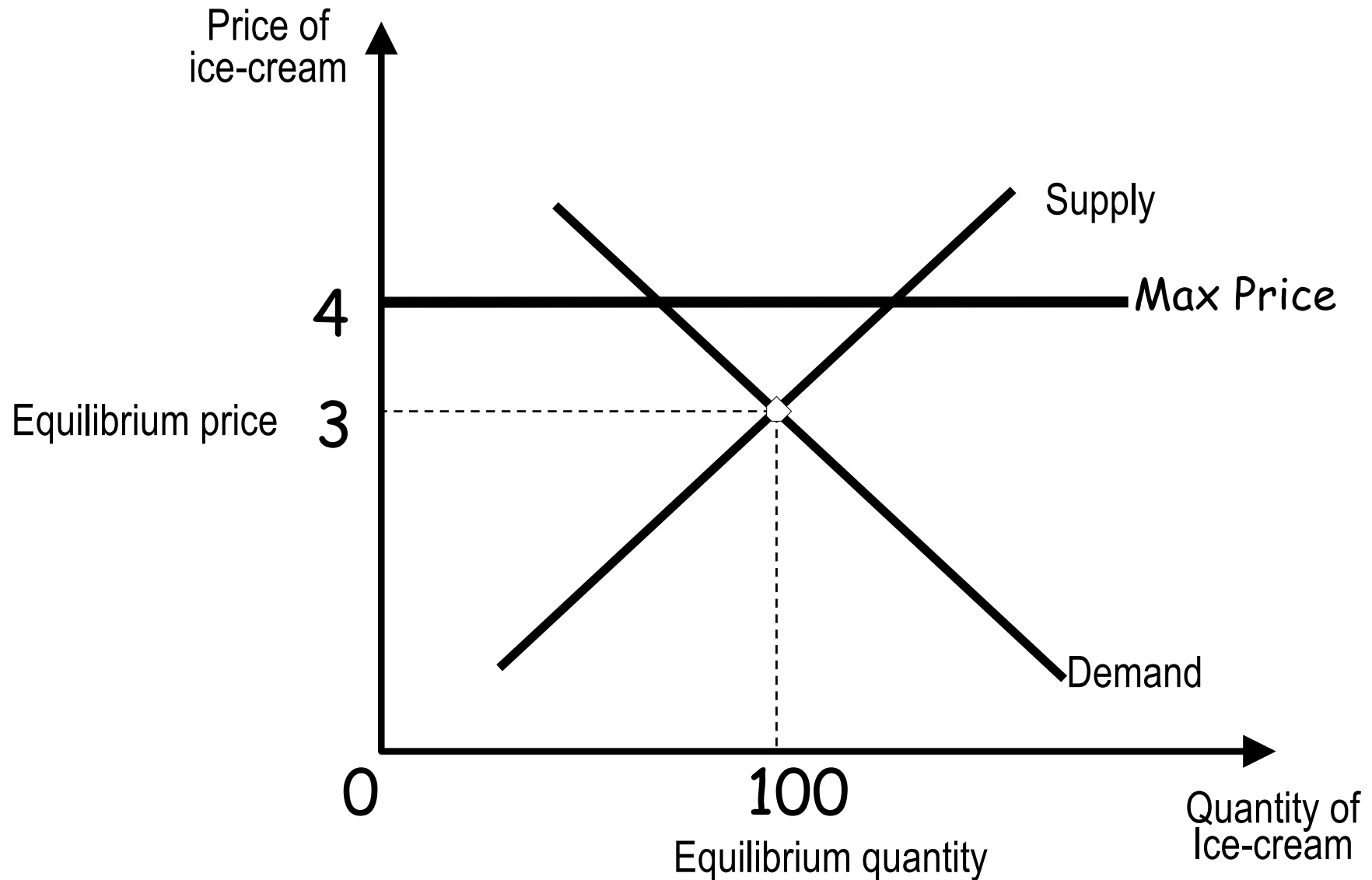
- Influences the behaviour of a firm.

The Government Policies

- In a free, unregulated market system, market forces establish equilibrium prices and exchange quantities.

- While equilibrium conditions may be efficient, it may be true that not everyone is satisfied.

- One of the roles of economists is to use their theories to assist in the development of policies.
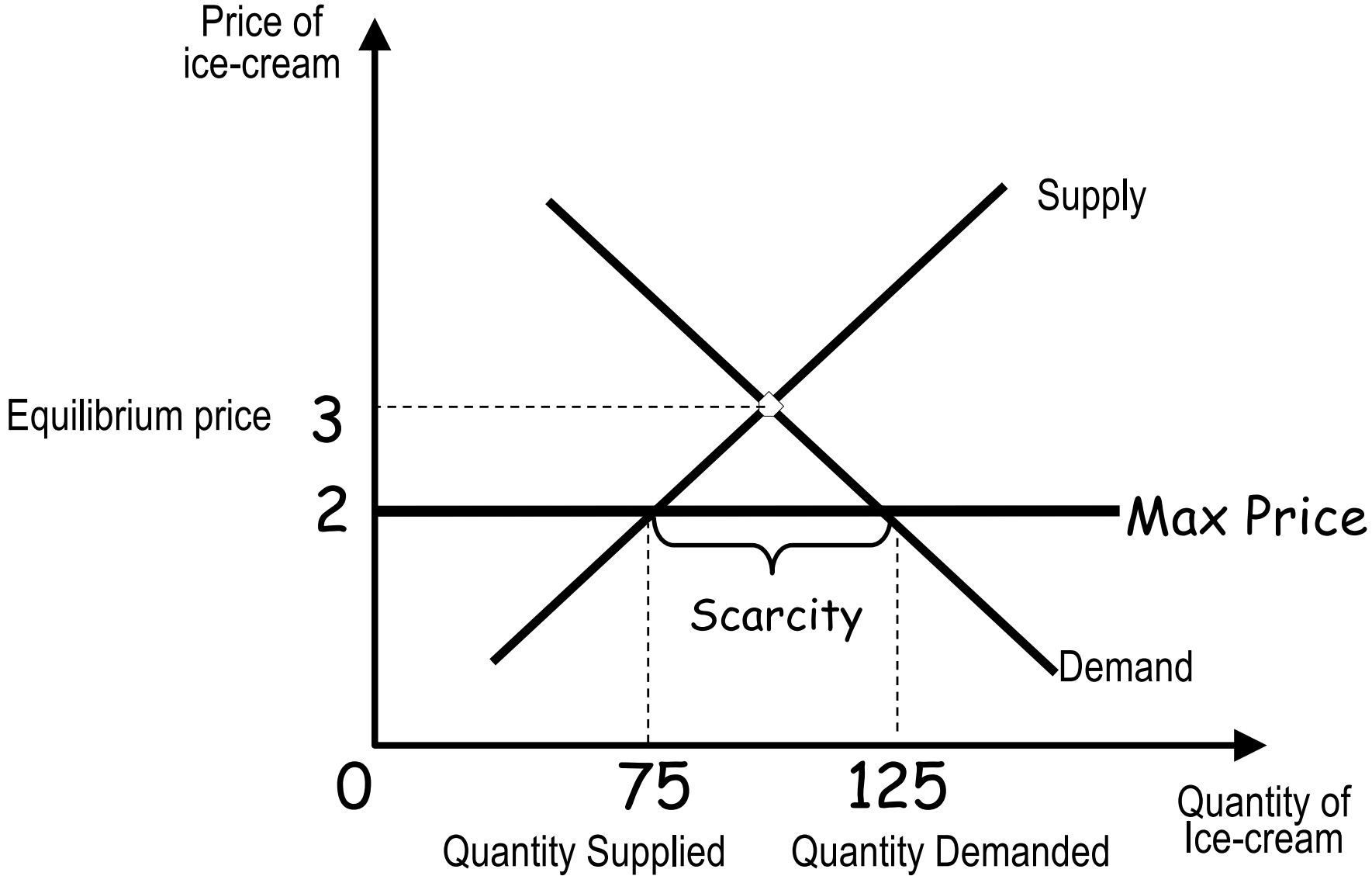
CONTROLS ON PRICES

- Are usually enacted when policymakers believe the market price is unfair to buyers or sellers.

- Result in government-created price ceilings and floors.

- *Price Ceiling*
  - A legal *maximum* on the price at which a good can be sold.

- *Price Floor*
  - A legal *minimum* on the price at which a good can be sold.

Maximum price is
NOT CONSTRAINING / BINDING

The effects of max p

When it is constraining, a max p ...

. . . Generate scarcity $Q_D > Q_S$

Example: Scarcity of petrol in the US in 1970.

. . . Rationing of the good.

Example: long queues,
or: seller's discrimination practices.

Min level of prices

Two possible consequences:

- p min is NOT CONSTRAINING: if p min < than equilibrium price.

- p min IS CONSTRAINING: if p min > than equilibrium price. In this case **excess supply** is generated.
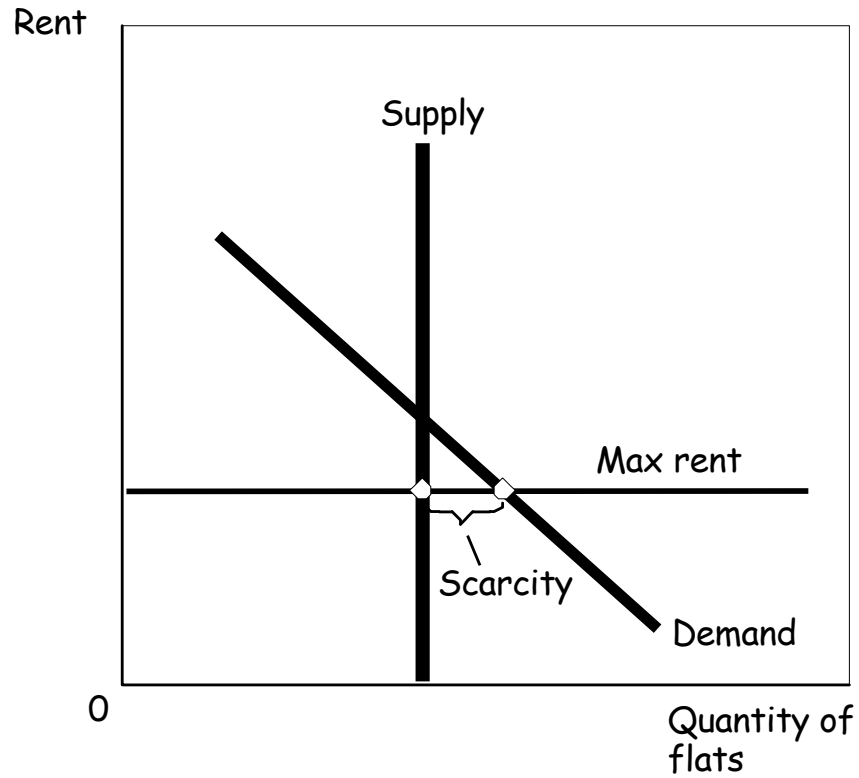
Effects of a min p

When constraining, min p generates . . .
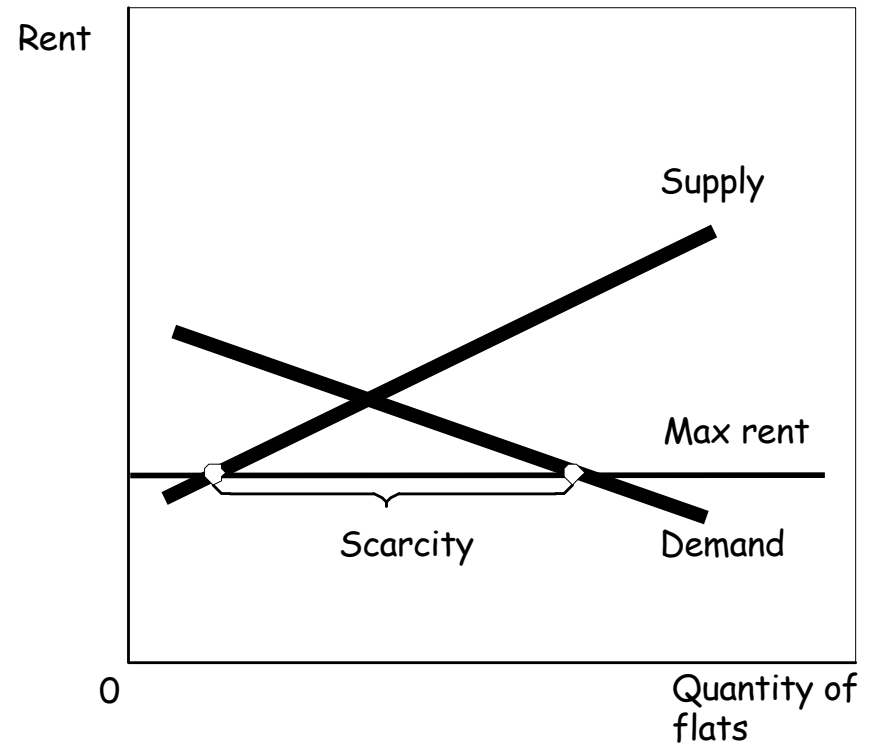
. . . An excess of supply $Q_S > Q_D$

. . . The resources in excess are wasted

Example: Minimum wage; Subsidies to sustain the price of agricultural goods.
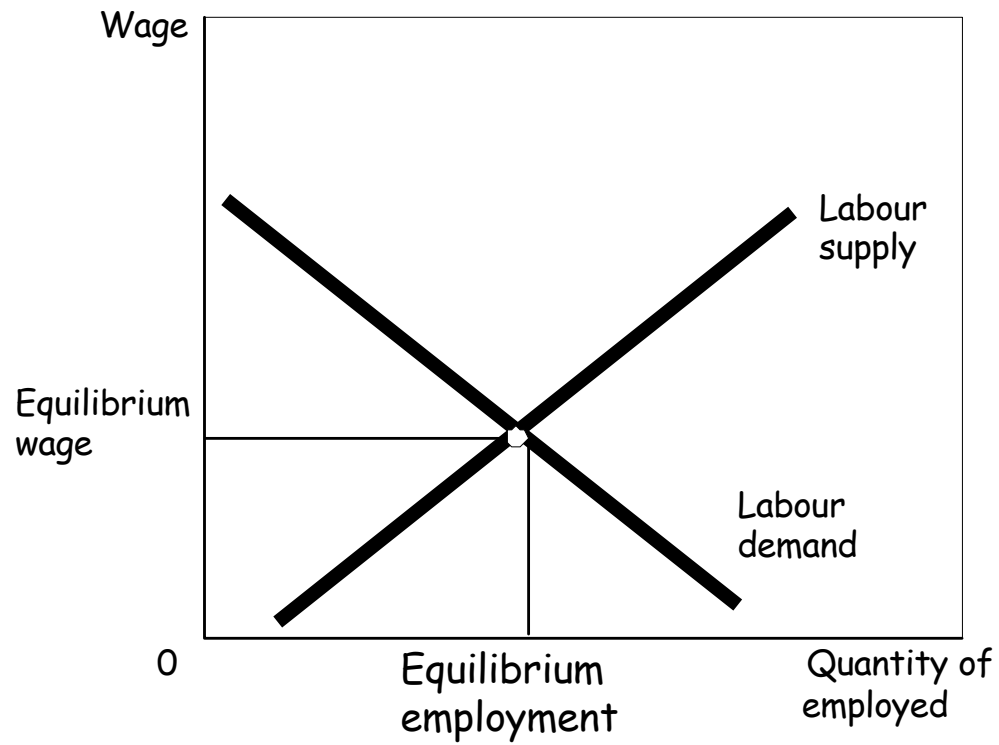
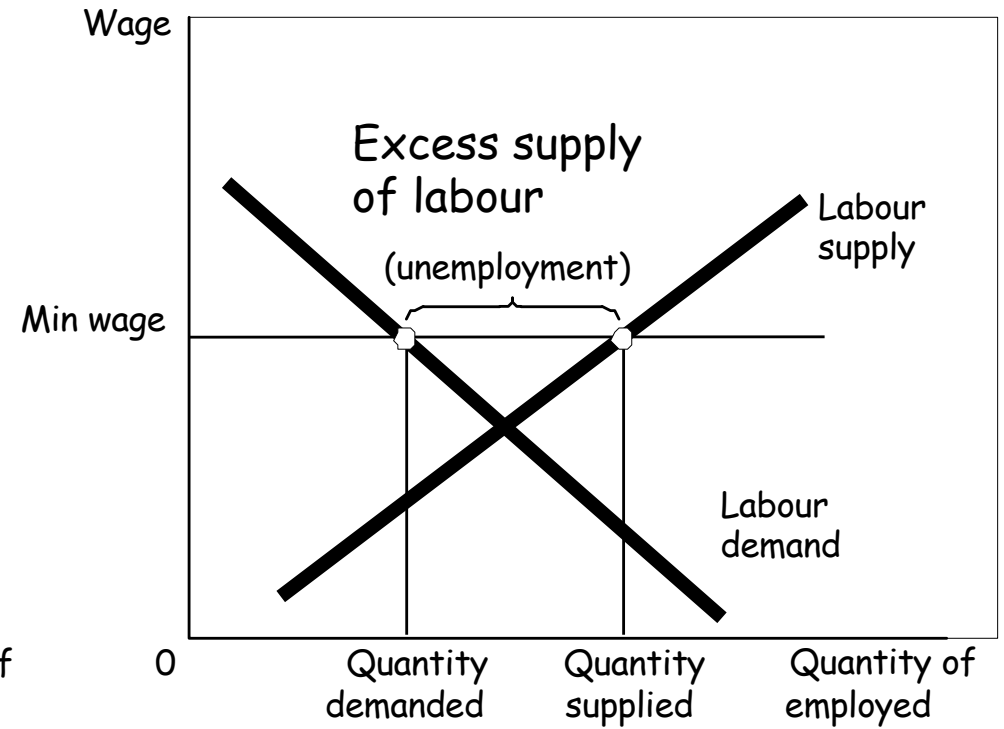## (a) Max rent in the short period (Supply and demand are inelastic)

Rent

Supply

Max rent

Scarcity

Demand

0

Quantity of flats

(b) Max rent in the long period (Supply and demand are elastic)

Rent

Supply

Max rent

Scarcity

Demand

0

Quantity of flats

(a) Free labour market

Wage

Equilibrium
wage

Labour
supply

Labour
demand

0   Equilibrium
     employment

Quantity of
employed

(b) Labour market with min wage

Wage

Excess supply
of labour

(unemployment)

Min wage

Labour
supply

Labour
demand

0   Quantity
     demanded

Quantity
supplied

Quantity of
employed

Taxes: Effects

Government uses taxation to finance public expenditure.

But taxes are not neutral in that they can discourage market activities.

When a good is taxed, the quantity that is sold diminishes.

In the majority of the cases, buyers and sellers share the tax burden.

The effect of a tax on consumption goods: First assumption

Initial price of an apple: $**1**

Then: consumption tax of $**0,10** for each apple. What happens to the price of apples after tax?

 Let's see the cases:

a)   The prince remains equal to $**1**. In this case, the tax is paid ONLY by the producer: the consumer pays $**1**; $0,10 goes to State and only $0,90 to the producer;

b)   The price rises to $**1,10**. Then the tax is paid ONLY by the consumer.

The effect of a tax on consumption goods

In the majority of the cases **"the true lies in between":** the tax rises both the price to consumers and the price to producers.

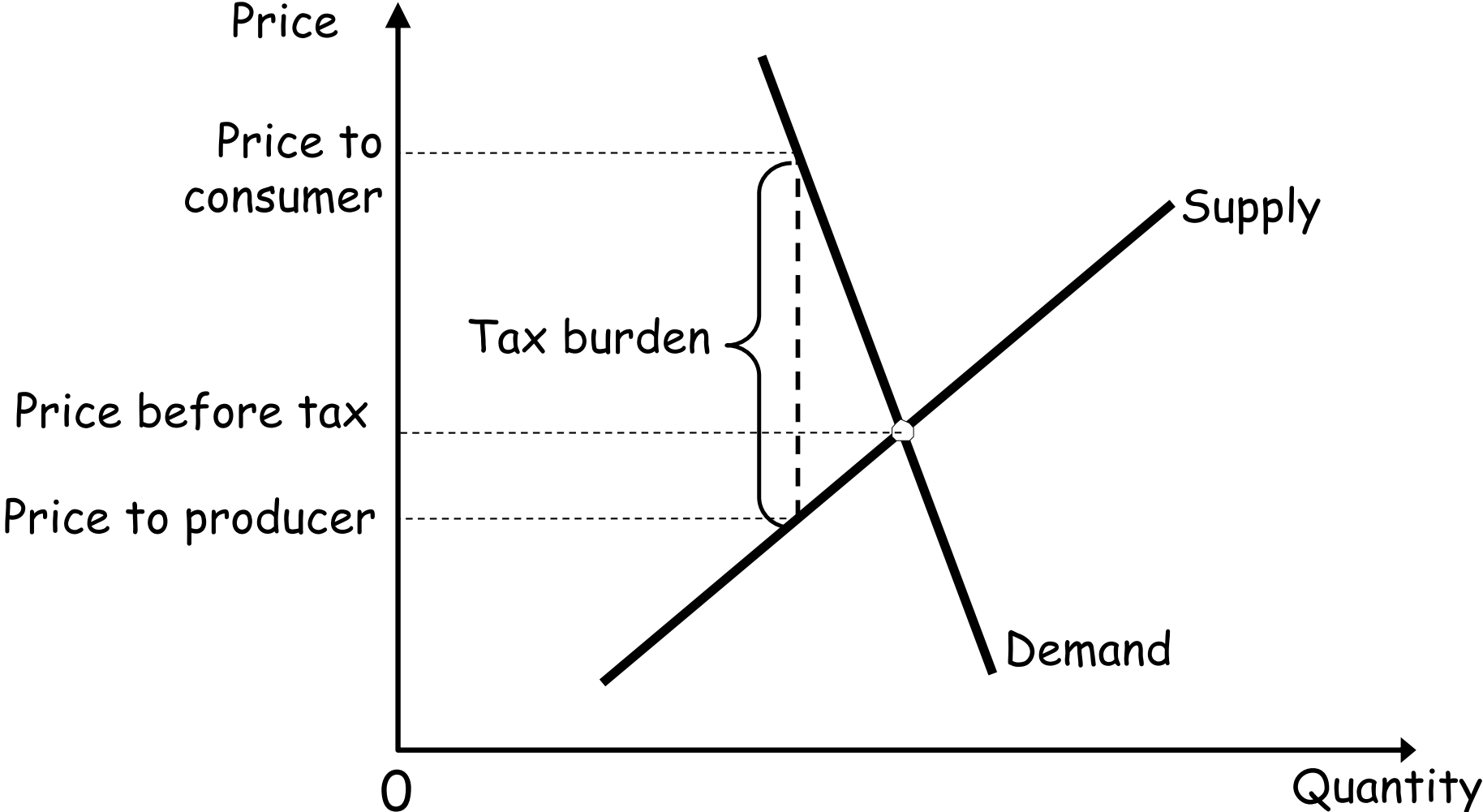Example: the price to consumers can become 1,05 and the price to producers 0,95.

The final price depends on the elasticity of demand and supply.
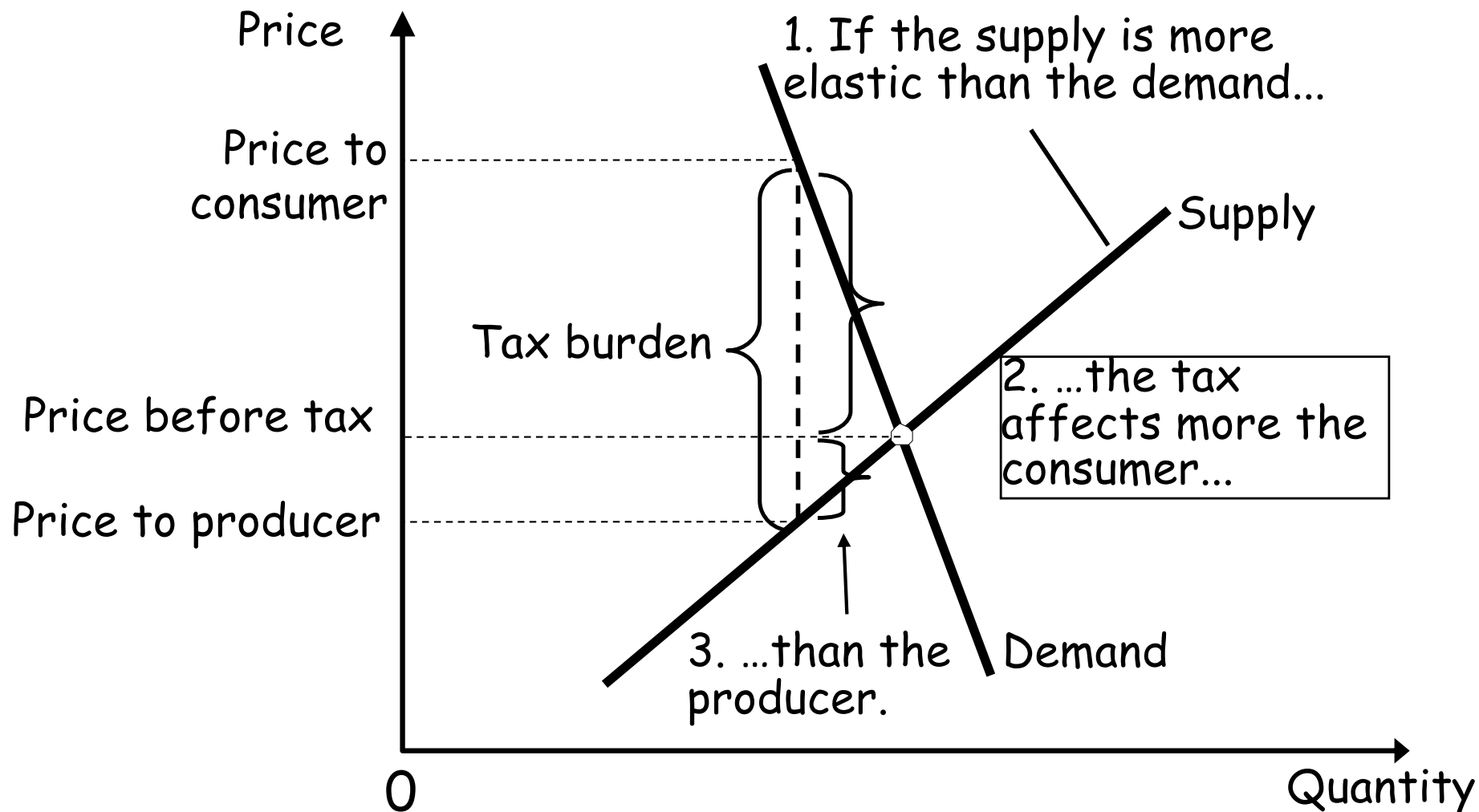
Elasticity and incidence of taxes

If the **demand** is **inelastic** and the **supply** is **elastic**: The tax is paid mainly by the **consumer**.

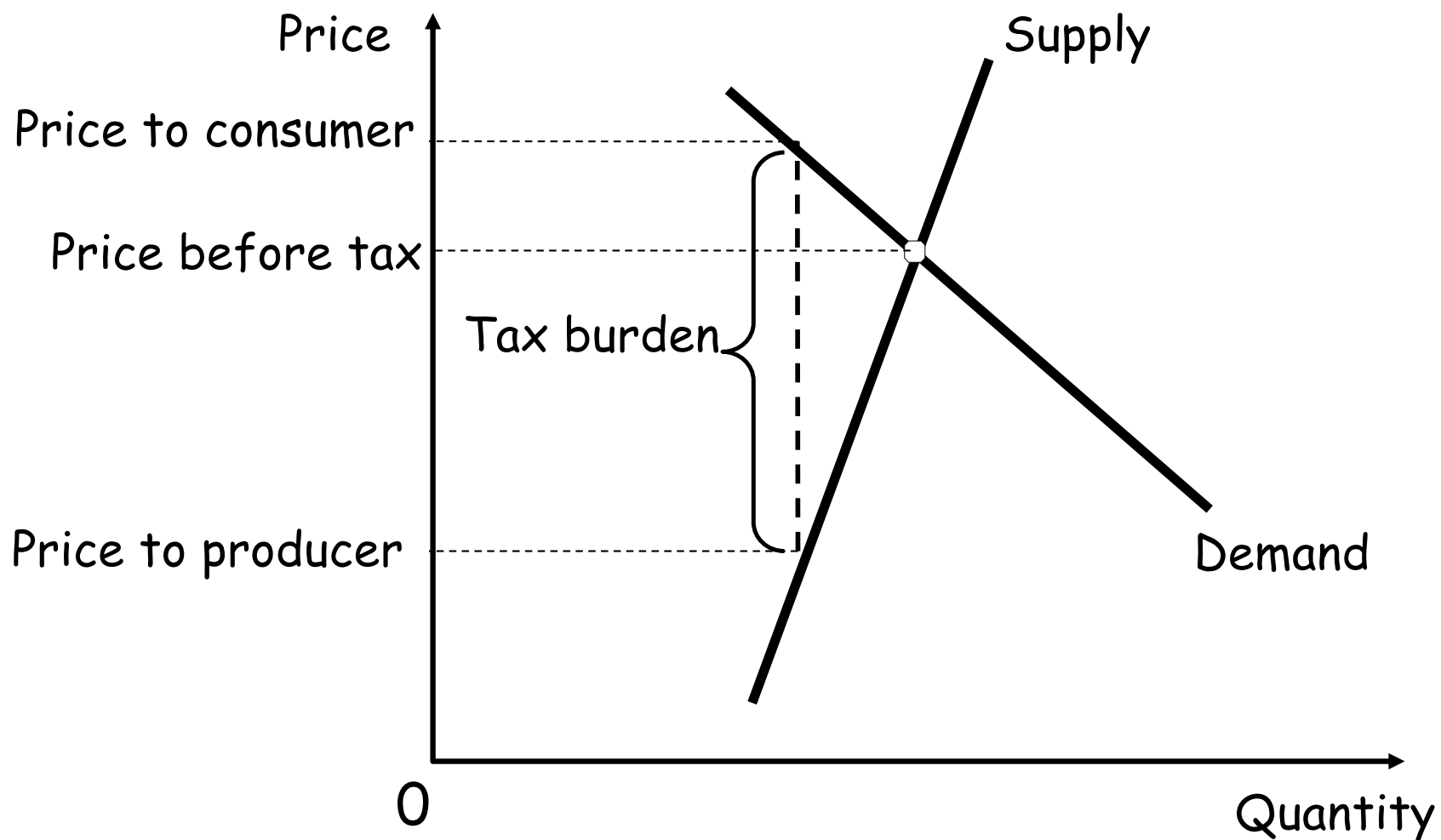If the **demand** is **elastic** and the **supply** is **inelastic**: The tax is paid mainly by the **producer**.
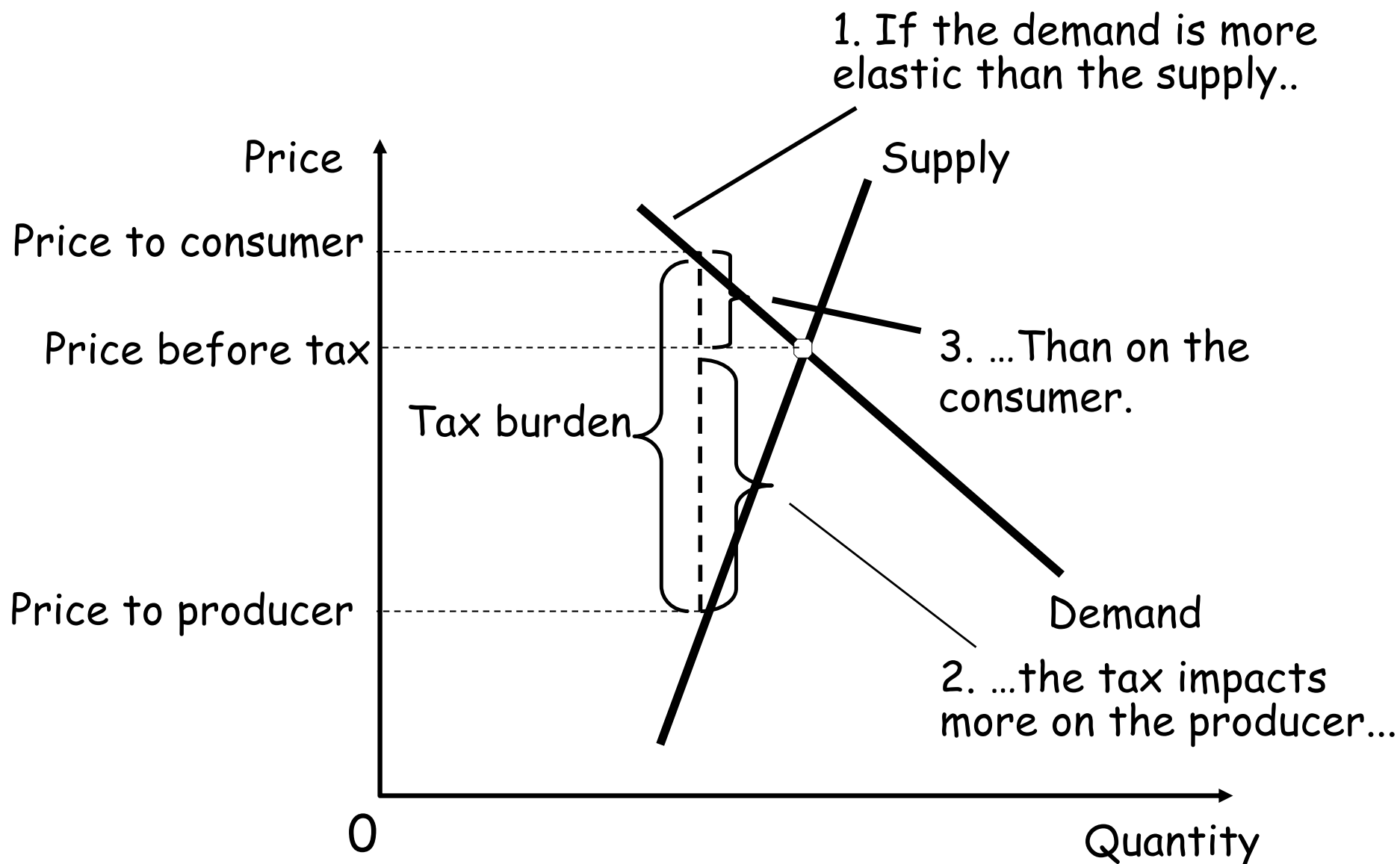
Elastic supply + inelastic demand

Elastic supply + inelastic demand

Inelastic supply + elastic demand

Price

Price to consumer

Price before tax

Tax burden

Price to producer

Supply

Demand

0

Quantity

Inelastic supply + elastic demand

1. If the demand is more elastic than the supply..

Price

Supply

Price to consumer

Price before tax

3. ...Than on the consumer.

Tax burden

Price to producer

Demand

2. ...the tax impacts more on the producer...

0

Quantity

Summary #1: The Effect of Taxes

- Taxes are used to raise revenue for public purposes.

- When the government levies a tax on a good, the equilibrium quantity of the good falls.

- A tax on a good places a wedge between the price paid by buyers and the price received by sellers.

Summary #2: Tax Incidence

- The incidence of a tax refers to who bears the burden of a tax.

- The incidence of a tax does not depend on whether the tax is levied on buyers or sellers.

- The incidence of the tax depends on the price elasticity of supply and demand.

- The burden tends to fall on the side of the market that is less elastic.

THANK YOU

Mengakar Kuat
Menjulang
Tinggi