Unit 2
Supply and Demand

In accordance with the APT programme objectives of the lecture are to help You to:

- analyse the determinants of supply and demand and the ways in which changes in these determinants affect equilibrium price and output; in particular, to make the distinction between movements along the curves and shifts in the curves;
- consider the impact of government policies, such as price floors and ceilings, excise taxes, tariffs and quotas on the free-market price and quantity exchanged;
- understand the concepts of consumer surplus and producer surplus.

Required reading

Mankiw, N.G. Principles of Microeconomics. 6th edition. South-Western. 2009.

Chapter 4. The market forces of supply and demand.
Chapter 6. Supply, demand, and government policies.

Questions to be revised

- ✓Cost-benefit analysis;
- ✓Opportunity cost;
- ✓Economic benefit.

Demand

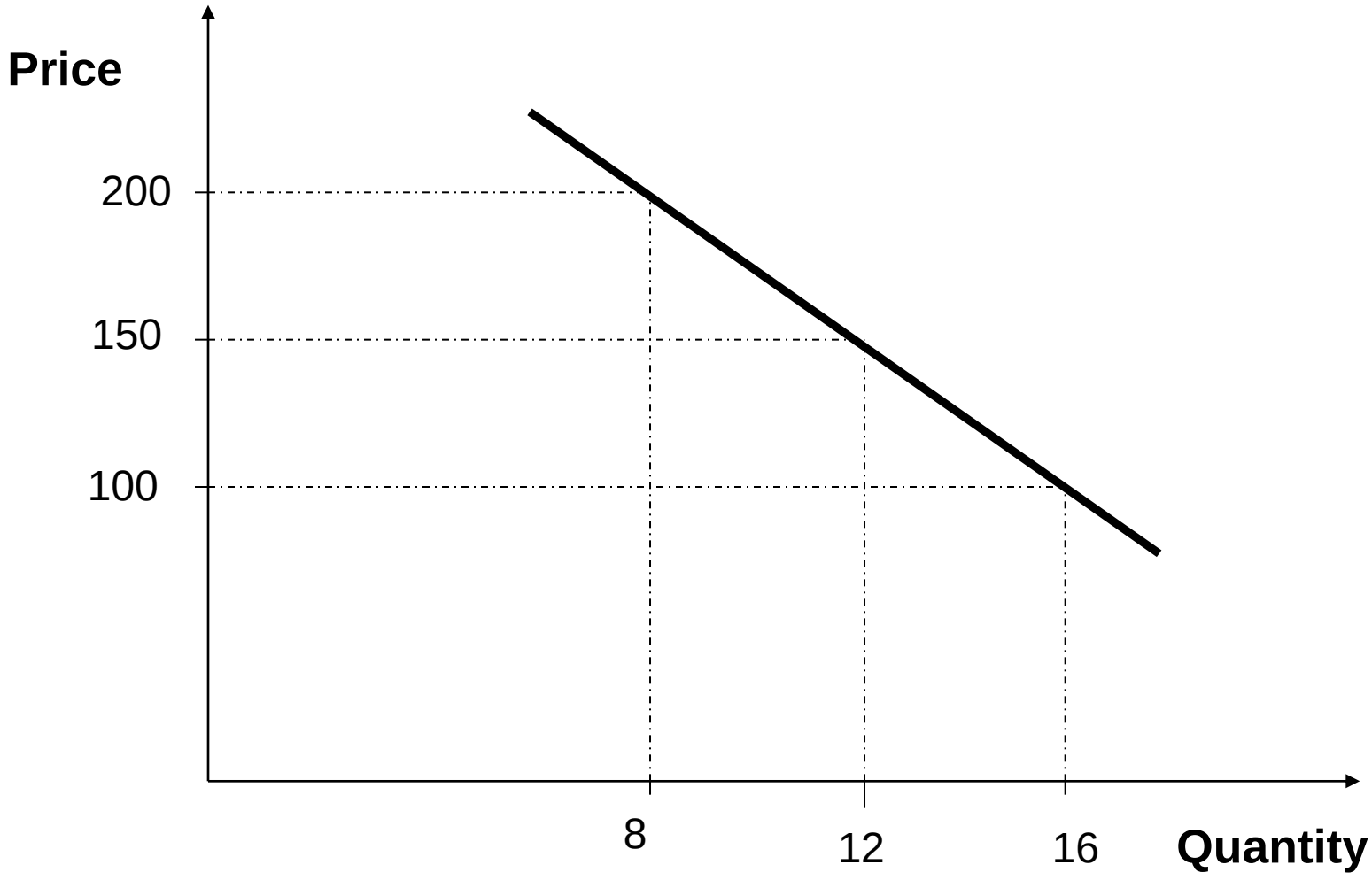
Demand curve –

A schedule or graph showing the quantity of a good that buyers wish to buy at each price.

Ex.: Demand for pizza in the city

Price (rub)	Quantity (1 000 slices a day)
100	16
150	12
200	8

Demand schedule (example)



Demand

Need to distinguish DEMAND and QUANTITY DEMANDED.

Demand describes behavior of buyers at every price – the whole schedule or graph.

Quantity demanded – how much of a good buyers would purchase at a given price.

Supply

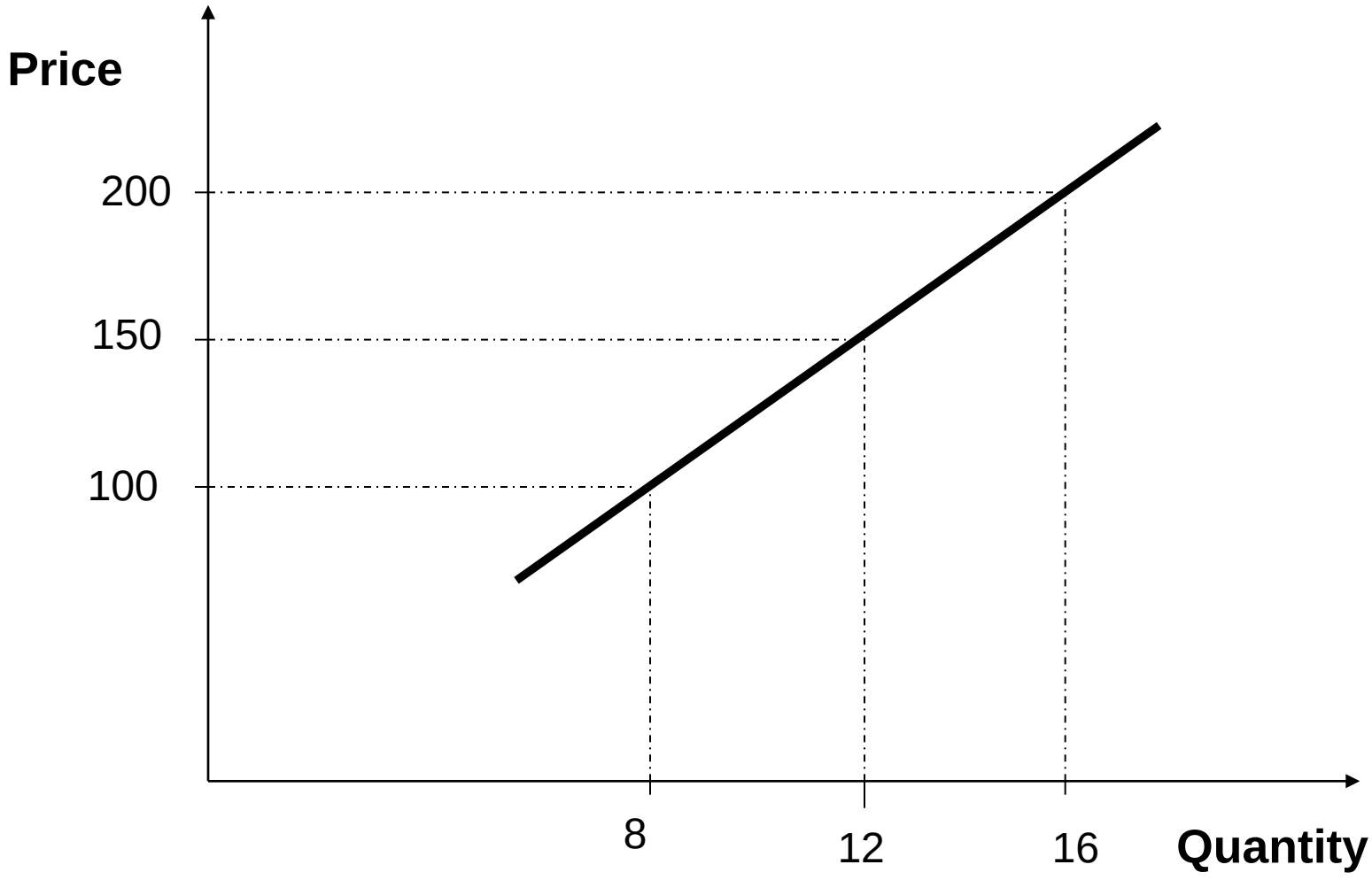
Supply curve –

A graph or schedule showing the quantity of a good that sellers wish to sell at each price.

Ex.: Supply of pizza in the city

Price (rub)	Quantity (1 000 slices a day)
100	8
150	12
200	16

Supply schedule (example)



Supply

Need to distinguish SUPPLY and QUANTITY SUPPLIED.

Supply describes behavior of sellers at every price – the whole schedule or graph.

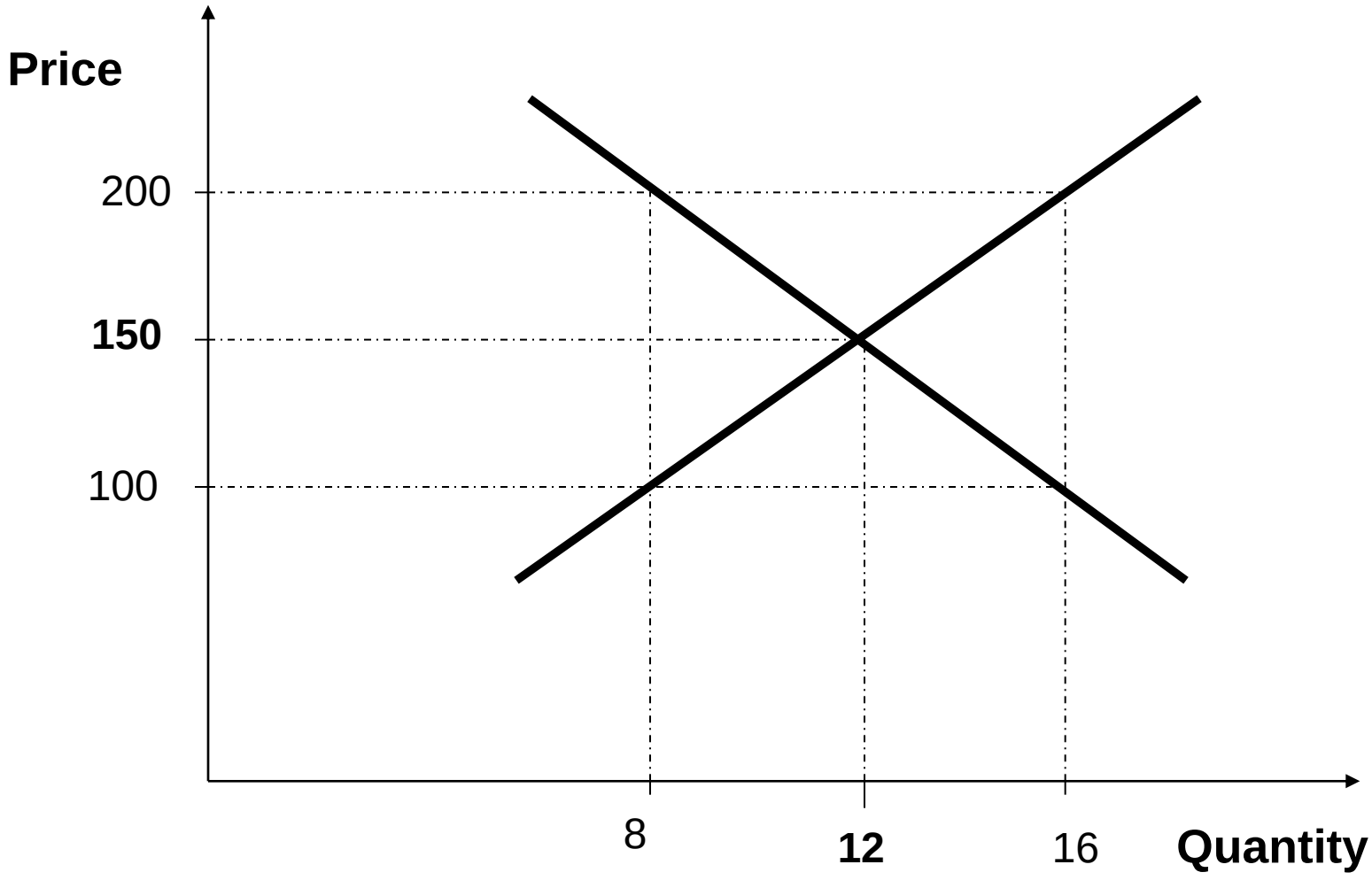
Quantity supplied – how much of a good sellers would want to supply at a given price.

Market Equilibrium

A market is in **equilibrium**, when no participant in the market has any reason to alter his or her behavior (no tendency for change).

Equilibrium price and **equilibrium quantity** – the values of price and quantity for which quantity supplied and quantity demanded are equal.

Market Equilibrium (example)



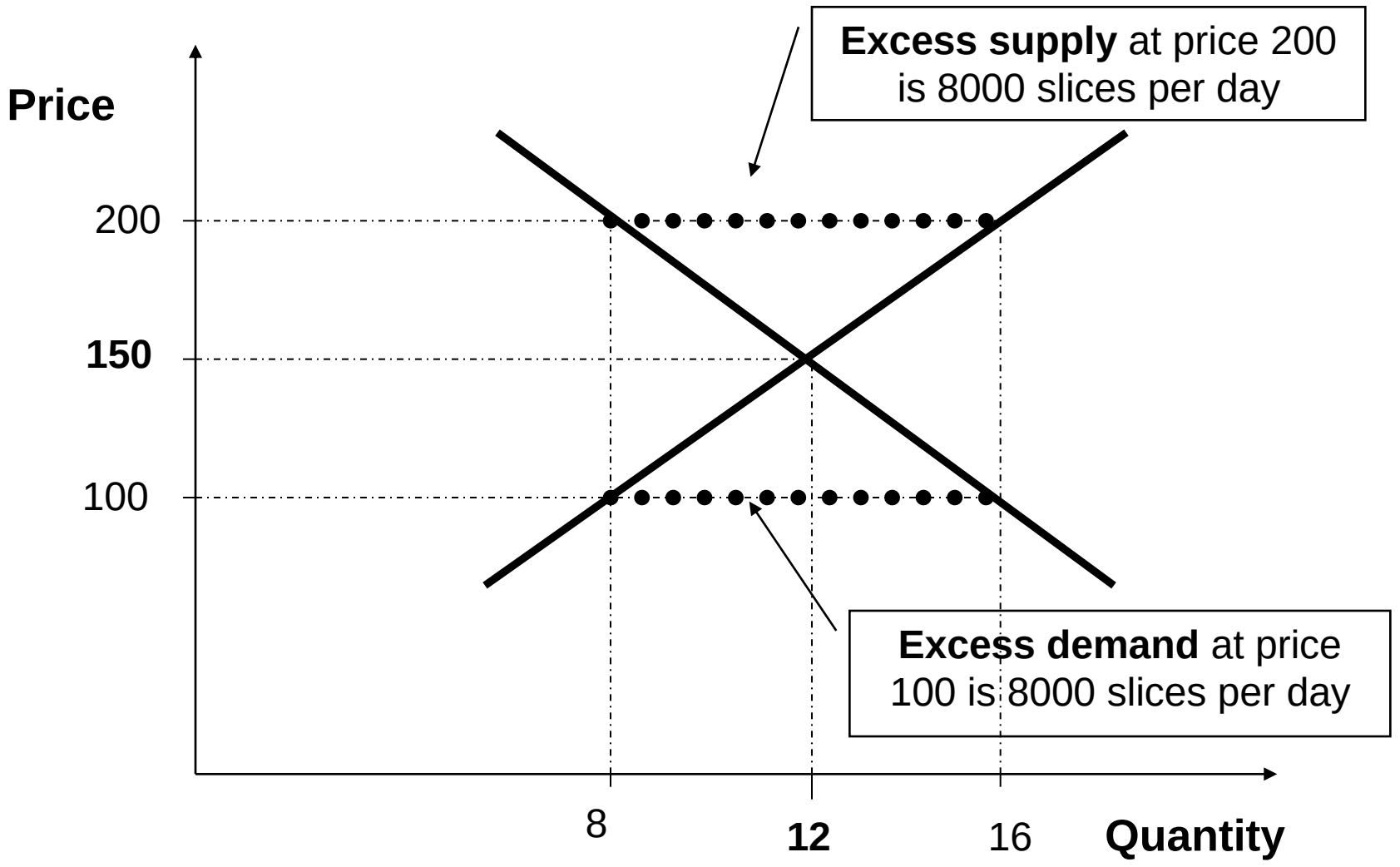
Market Equilibrium (definition)

Market equilibrium occurs in a market when all buyers and sellers are *satisfied* with their respected quantities at the market price.

Sellers are able to sell all they wish at the given price.

Buyers are able to buy all they wish at the given price.

Market Equilibrium (deviations)



Predicting and Explaining Changes in Prices and Quantities

When factors that govern supply and demand curves change, what happens to prices and quantities?

Need to distinguish:

Change in quantity demanded (supplied) – a movement along the demand (supply) curve that occurs in response to change in price.

Change in demand (supply) – a shift of the entire curve.

Demand Shifters

Demand depicts the relationship between price and quantity demanded.

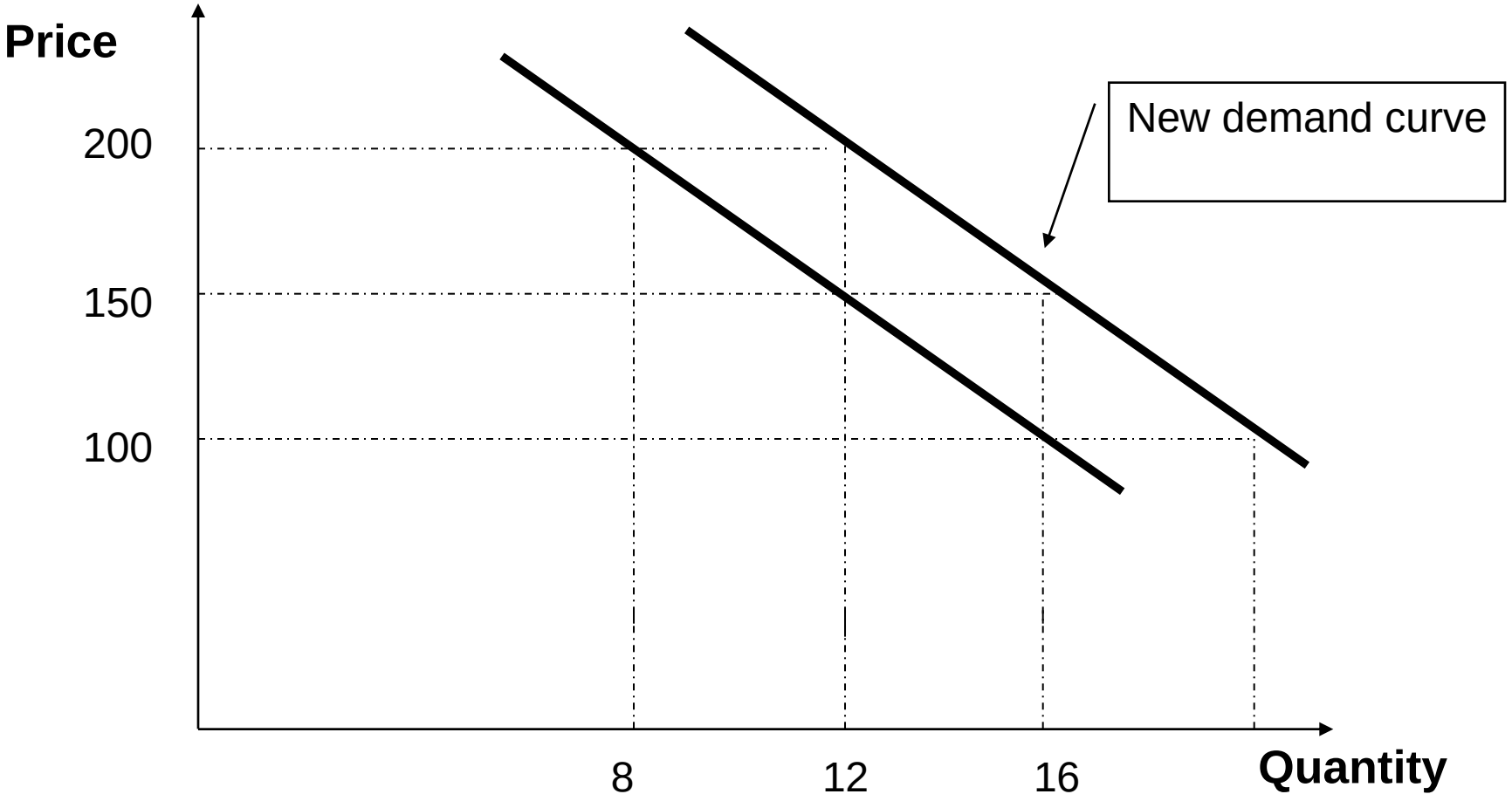
Other factors may affect quantity demanded for a given price.

In fact, they affect the whole schedule – demand itself.

Demand Shifters

1. Tastes

Pizza is healthy! Pizza is good for you!



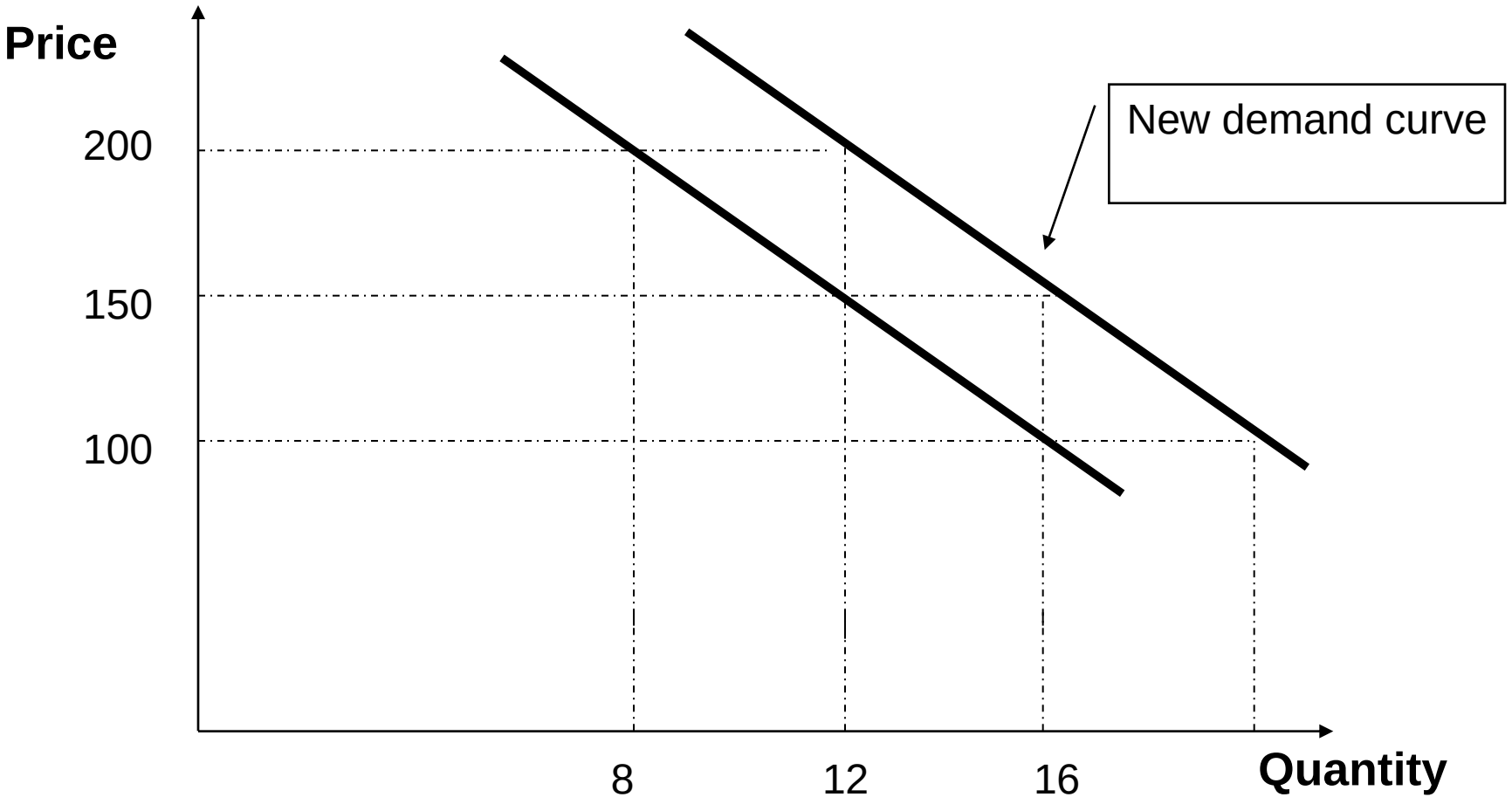
Demand Shifters

2. Income

Higher income increases demand for normal goods, decreases it for inferior goods.

Demand Shifters (example)

If pizza is a normal good:



Demand Shifters

3. Prices of other goods

Complements –

Two goods are compliments if an increase in the price of one reduces demand for the other.

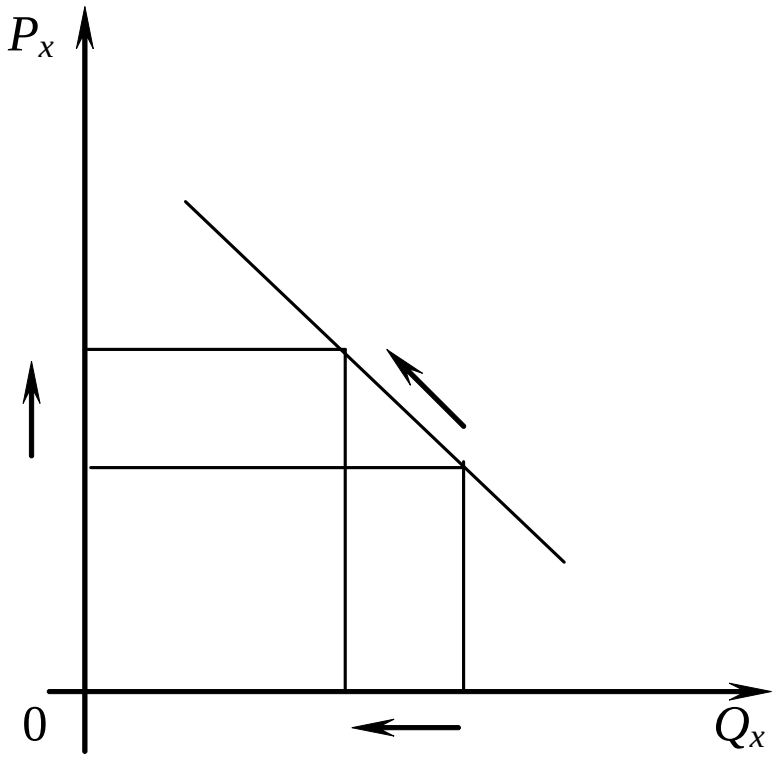
Ex.: Razors and blades, printers and cartridges, cars and fuel,…

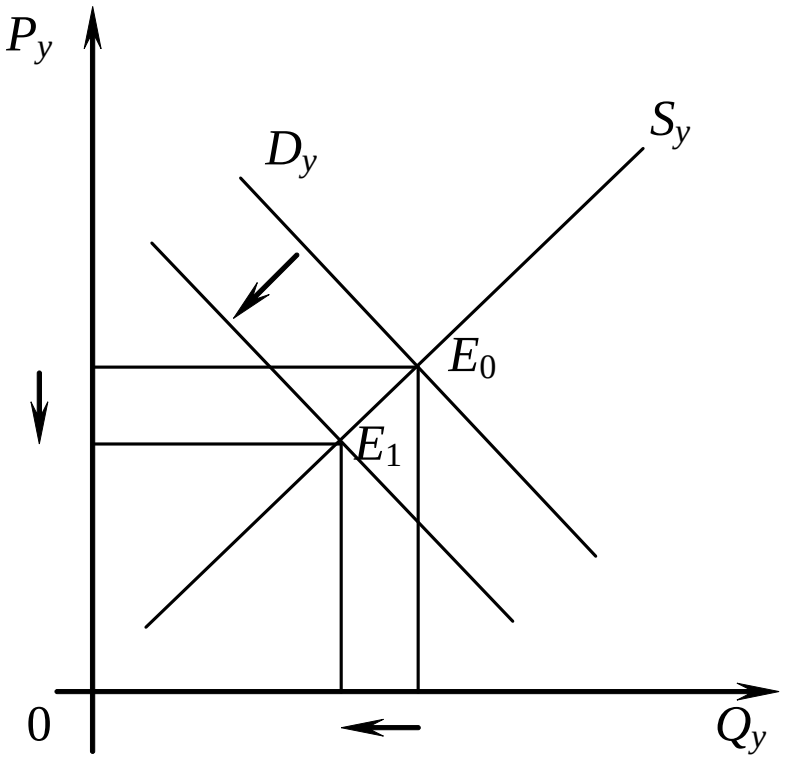
Substitutes –

Two good are substitutes if an increase in the price of one raises demand for the other.

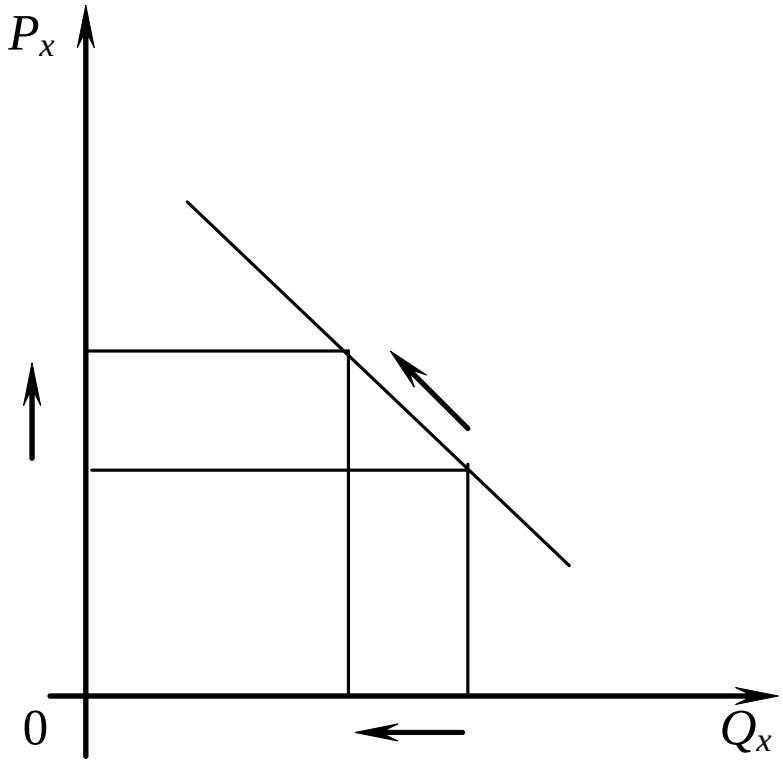
Ex.: Coke and Pepsi, trains and airplanes,…

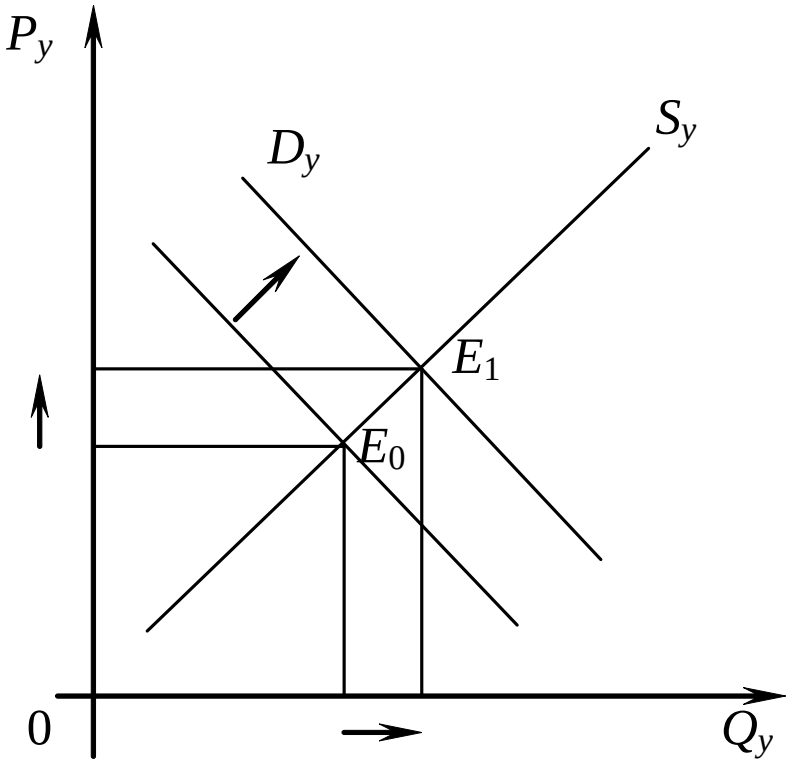
Markets for complementary goods





Markets for substitutes





Demand Shifters

4. Changes in the population of potential buyers;

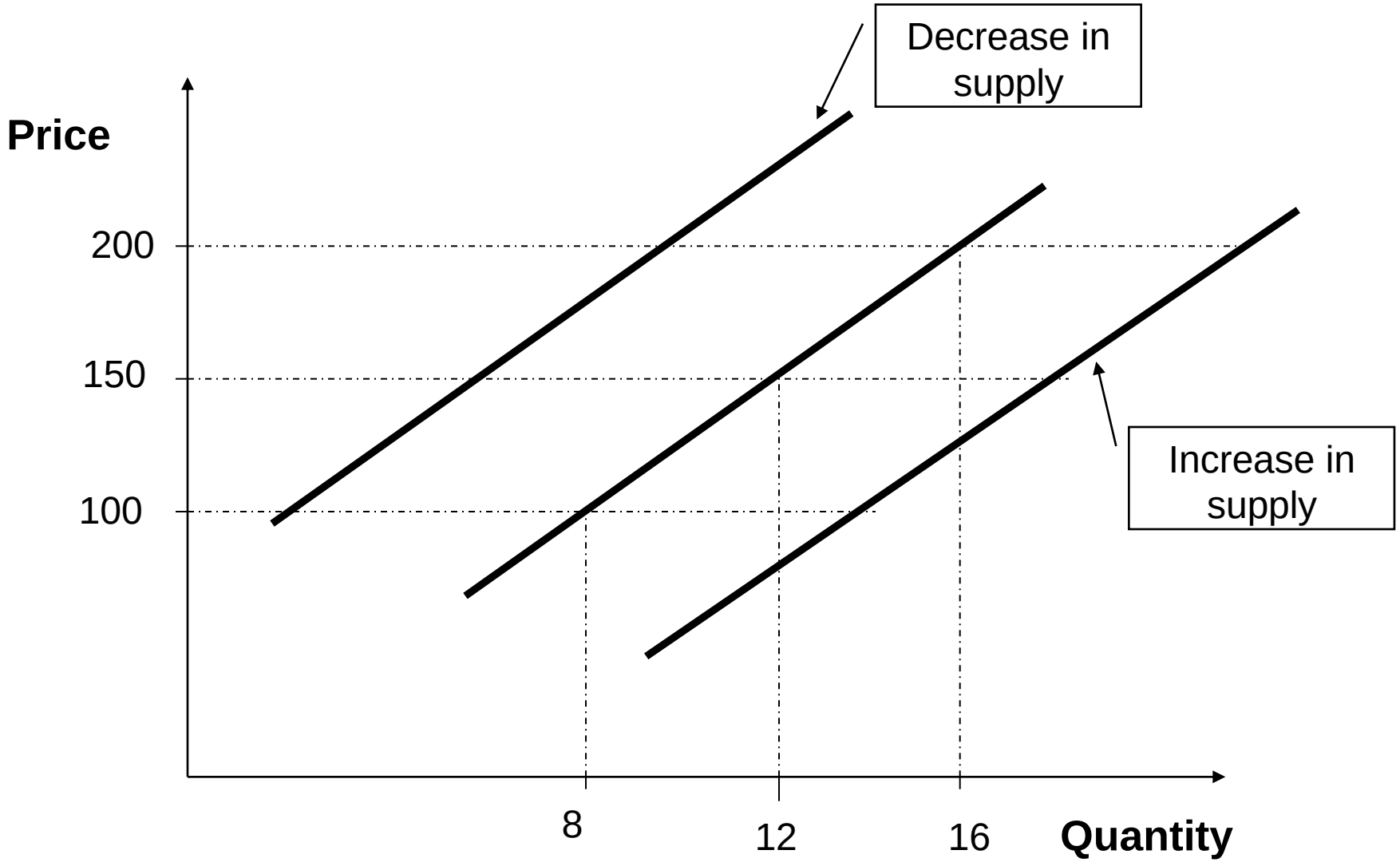
5. Expectations of higher/lower prices in the future.

Supply Shifters

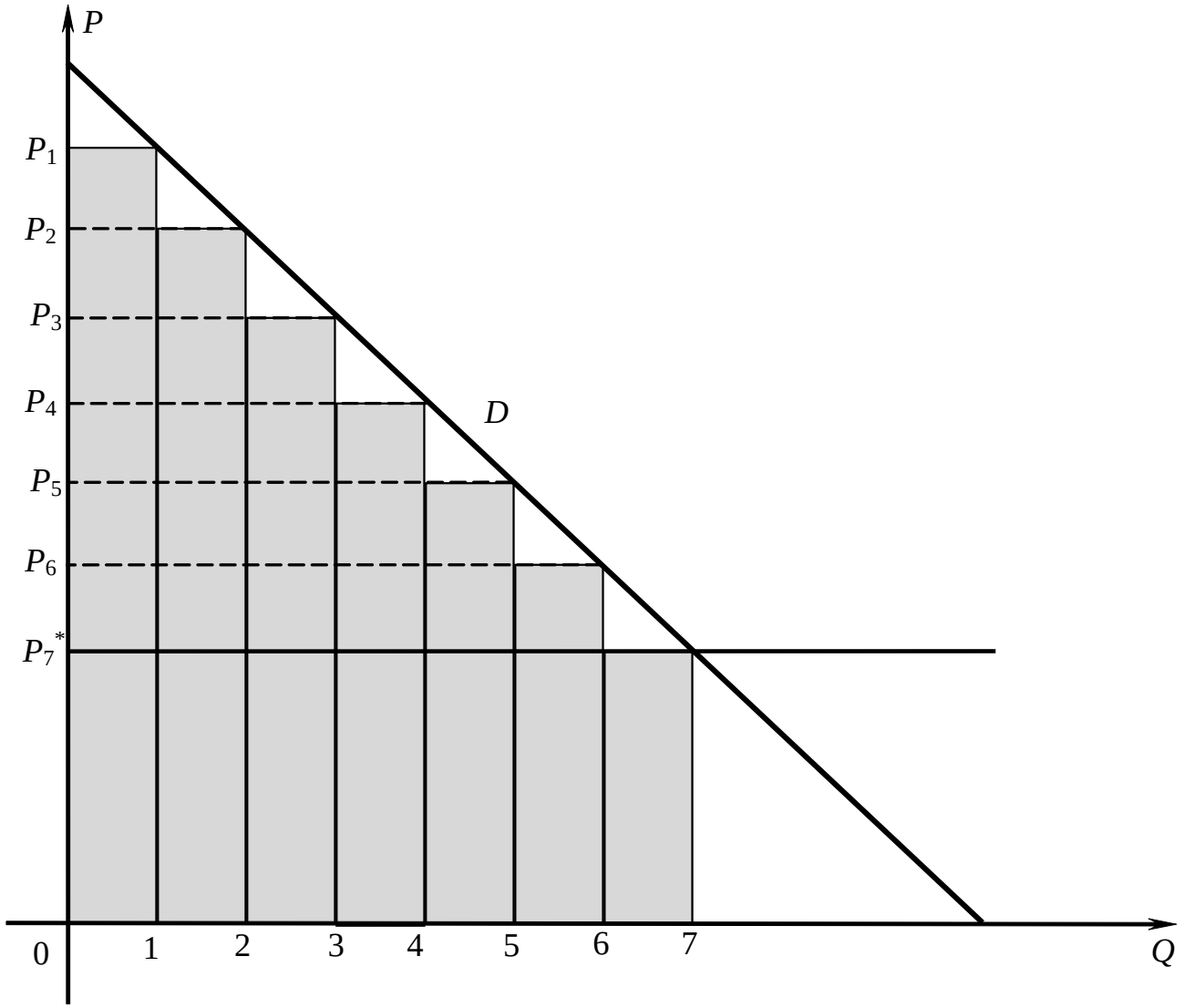
The major factors affecting supply have to do with costs of producing and selling a good.

1. Cost of inputs;
2. Technology;
3. Government regulation (safety and such);
4. Number of suppliers;
5. Expectations of future prices.

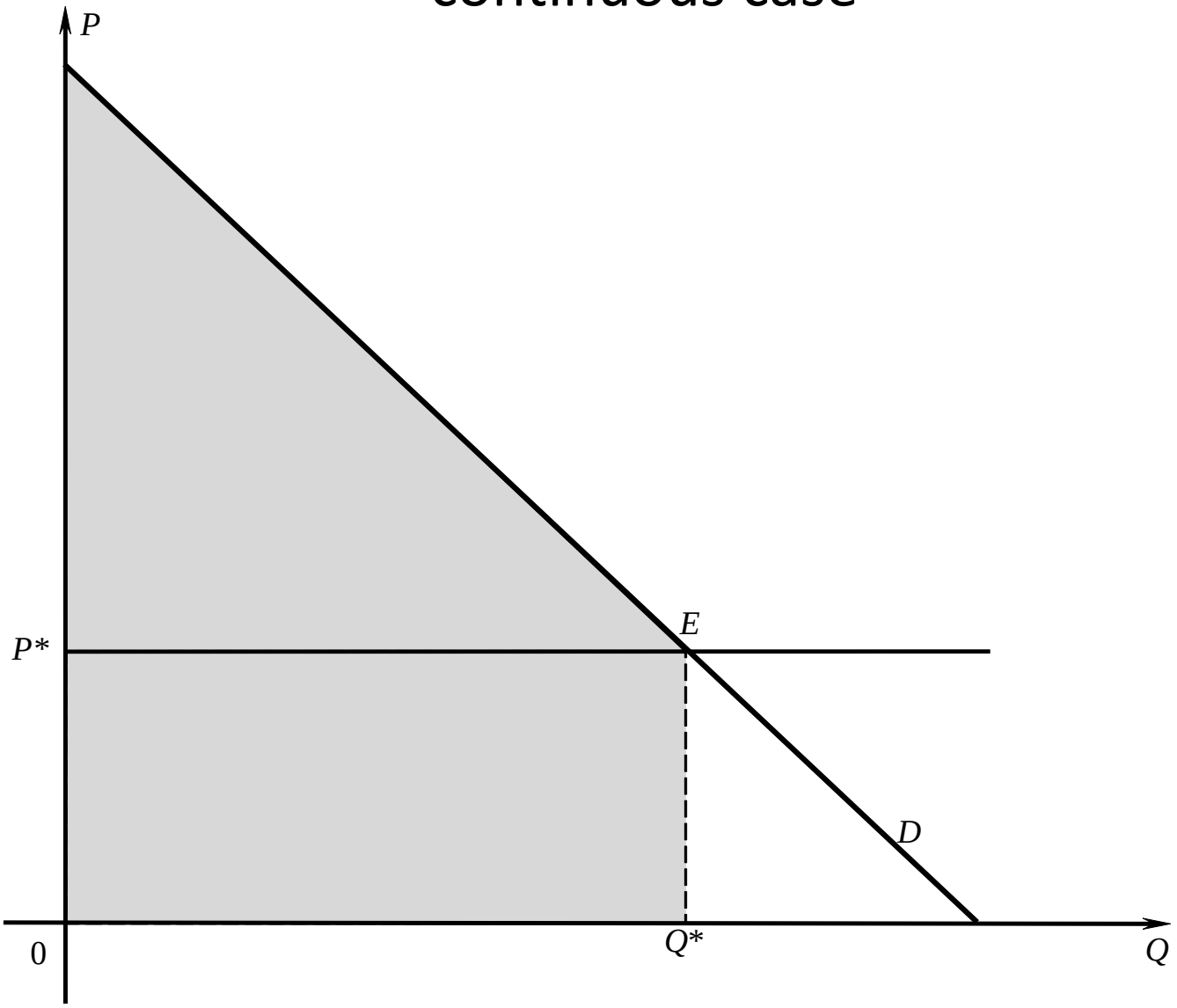
Supply Shifters (examples)



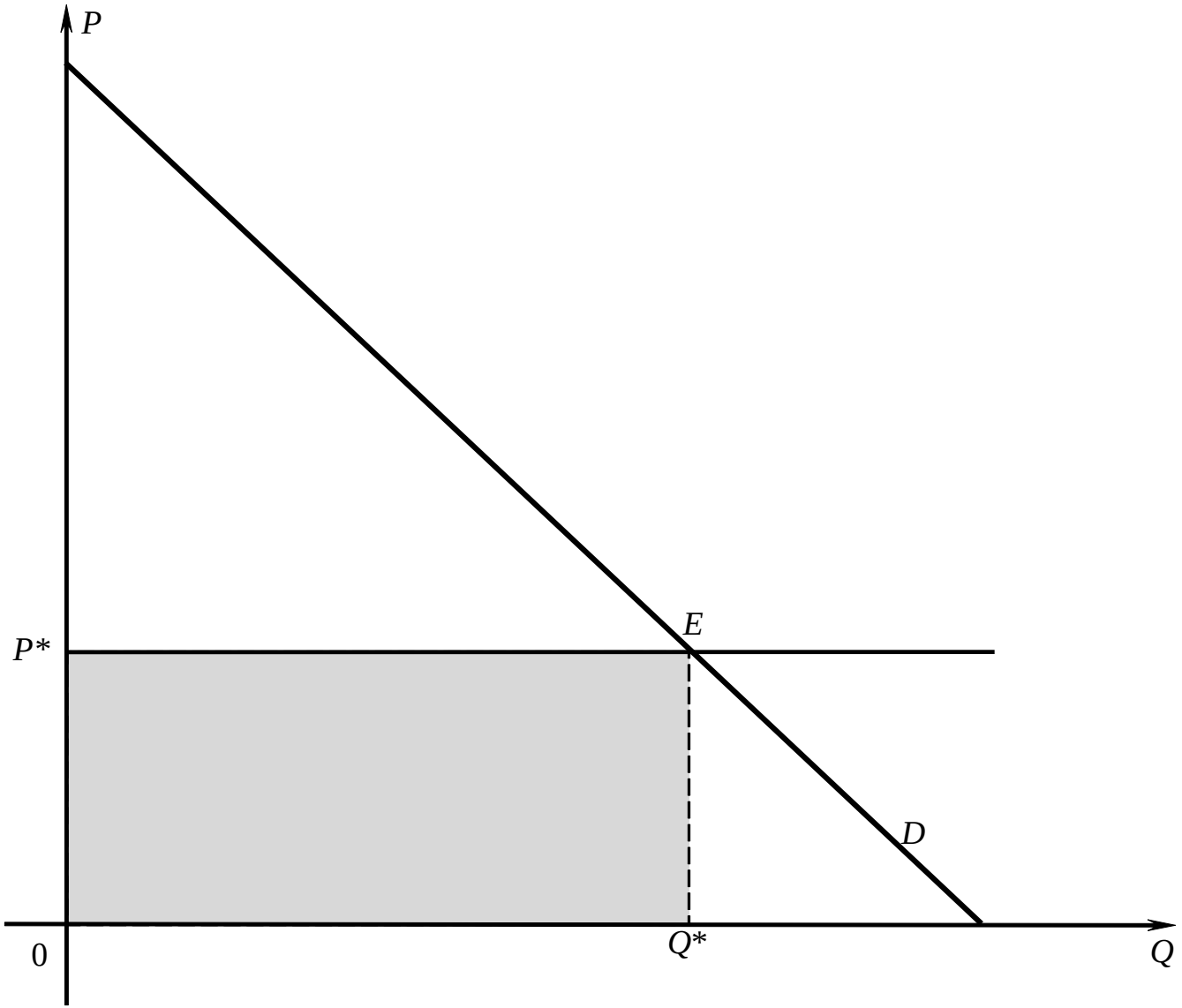
Consumer's willingness to pay (utility)



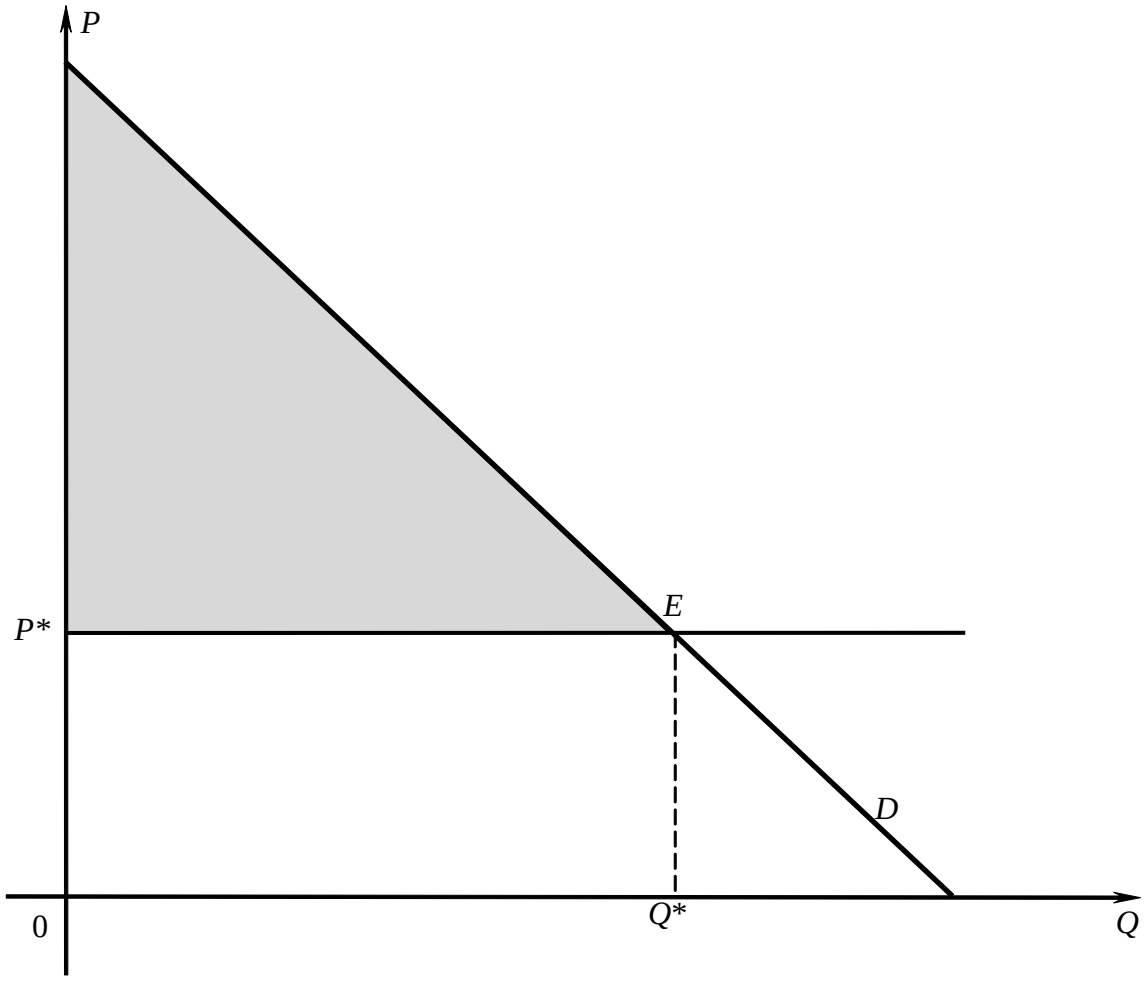
Consumers' willingness to pay (total benefit) – continuous case



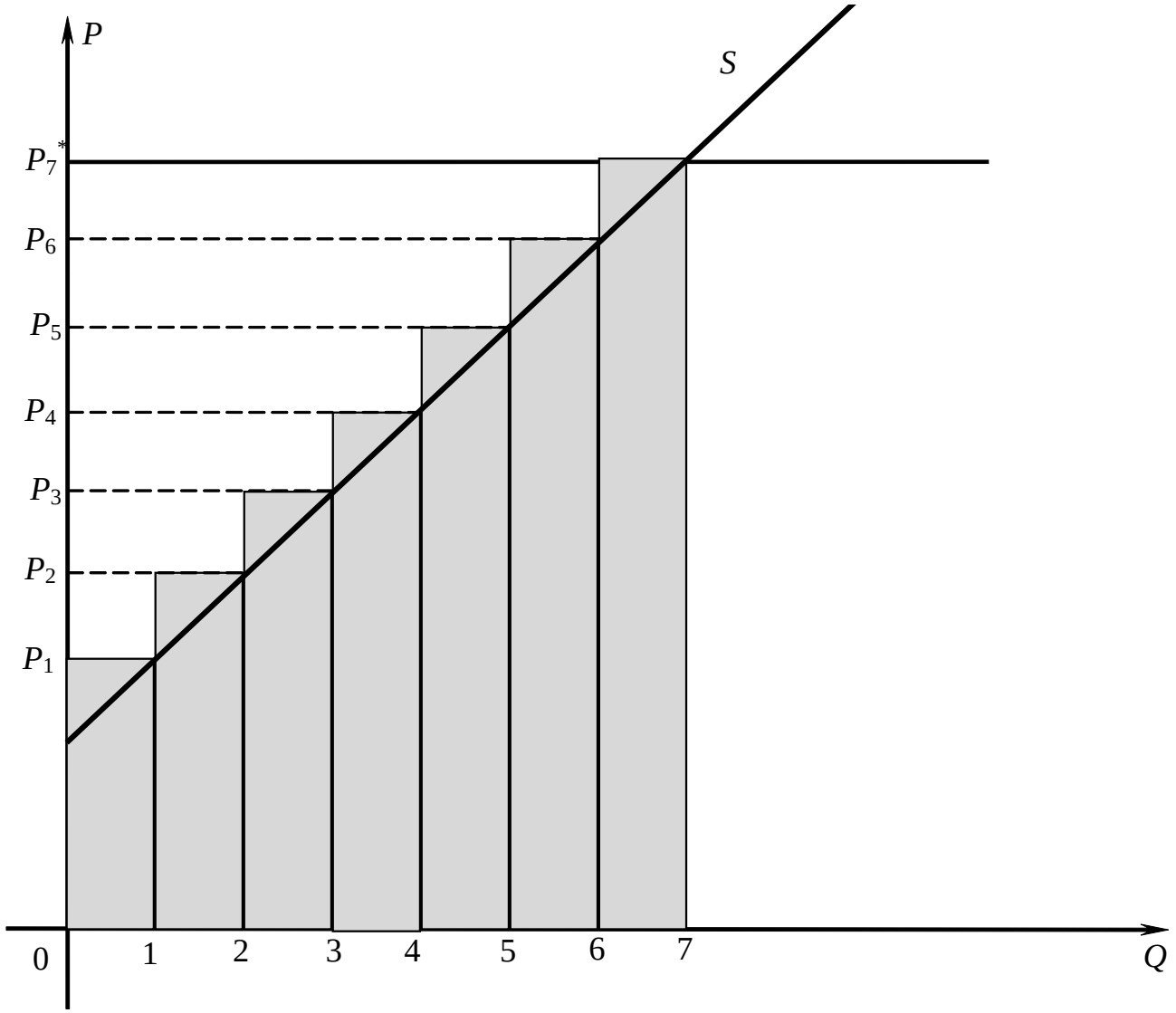
Consumers' expenditures



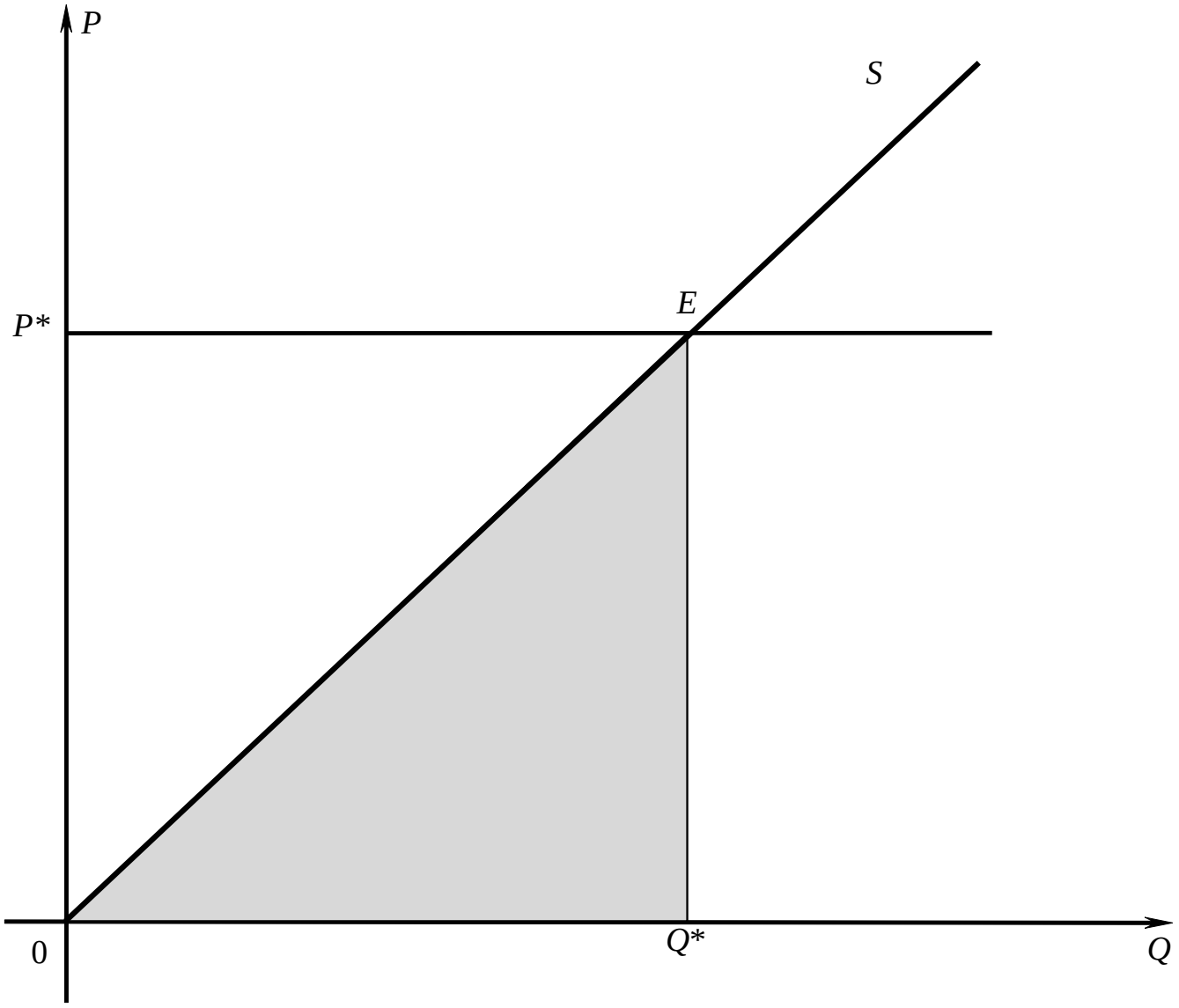
Consumers' surplus is the aggregate difference between their reservation prices and the prices that are actually paid



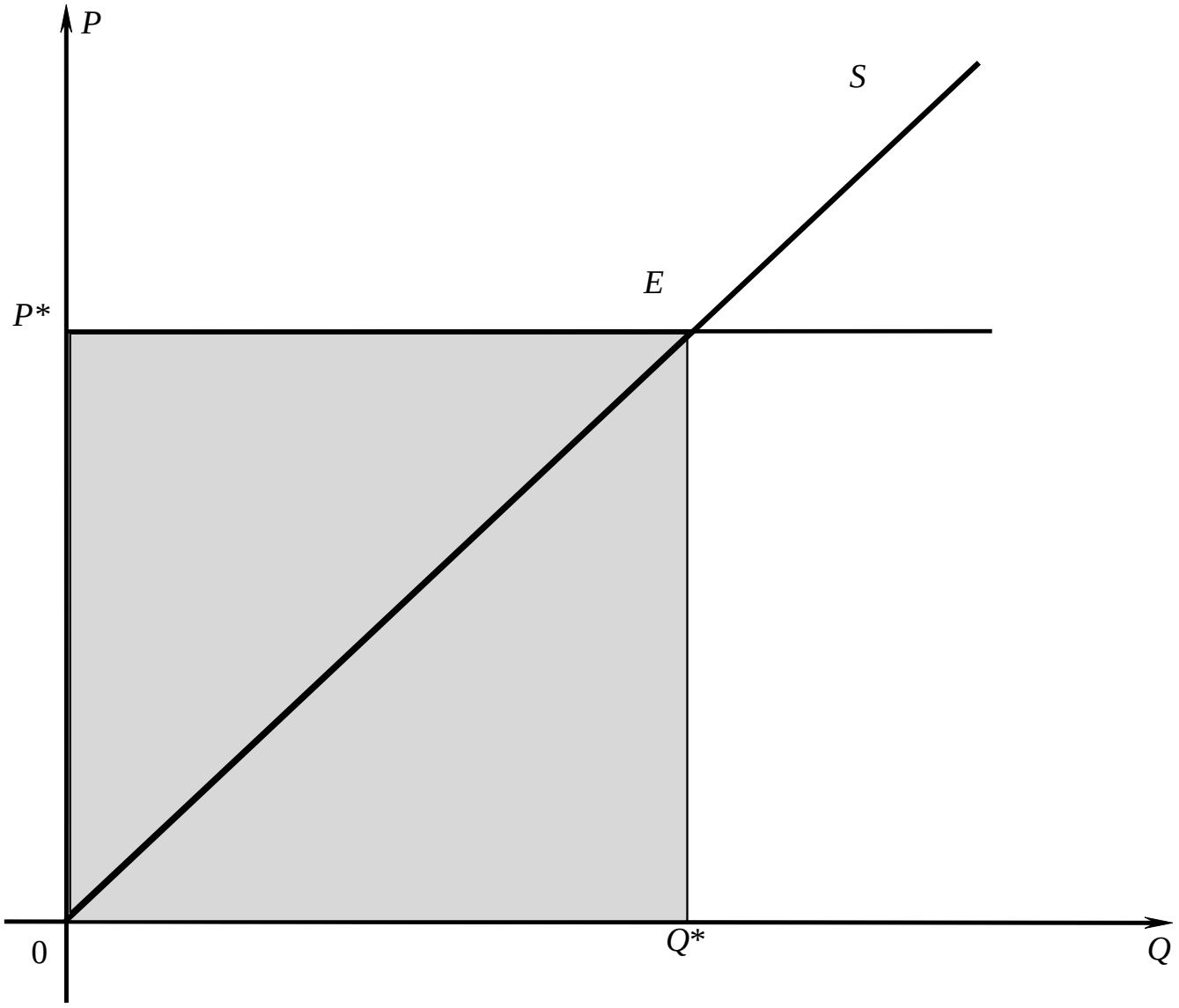
Total production cost (discrete case)



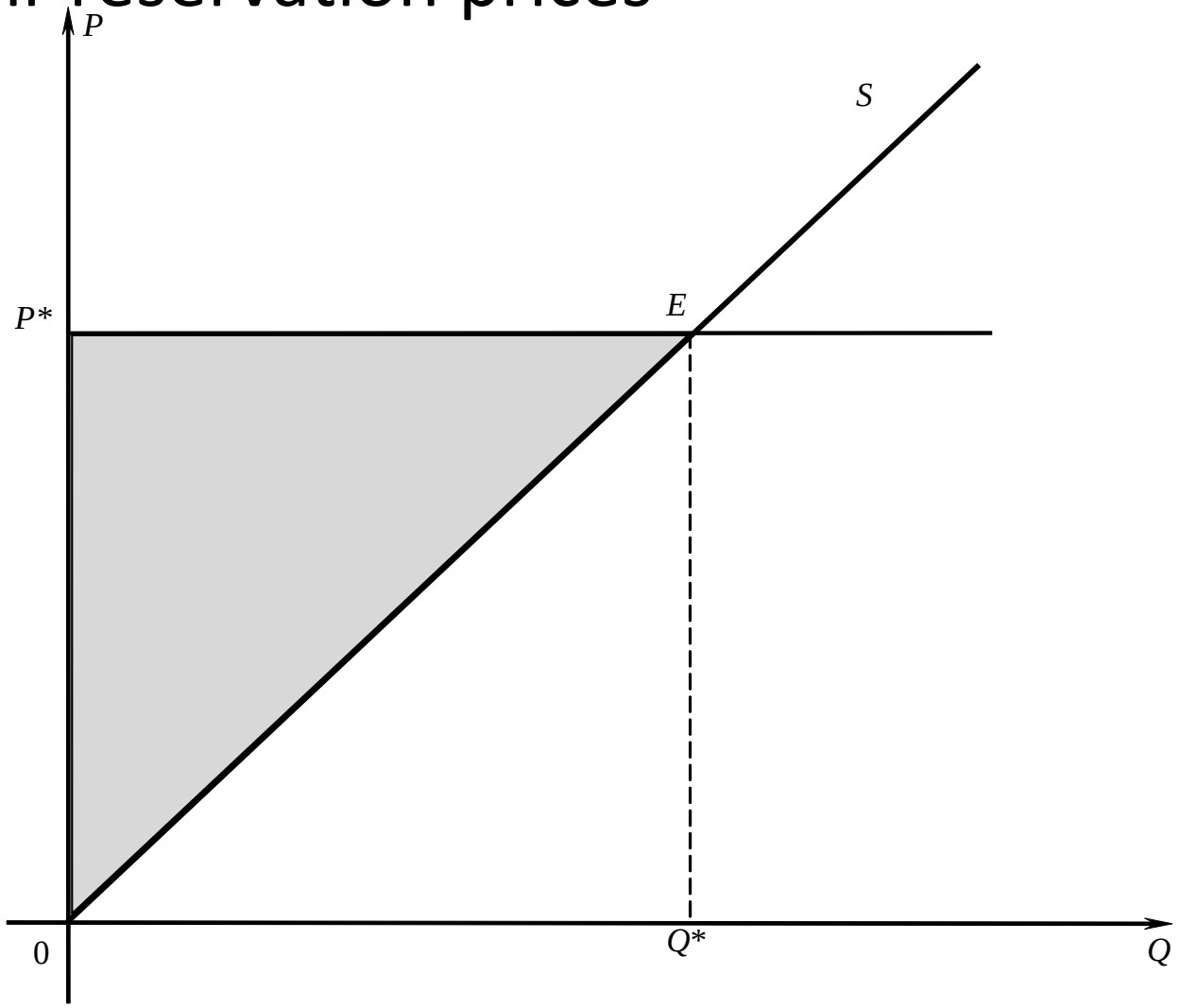
Total production costs (continuous case)



Total revenue of producers

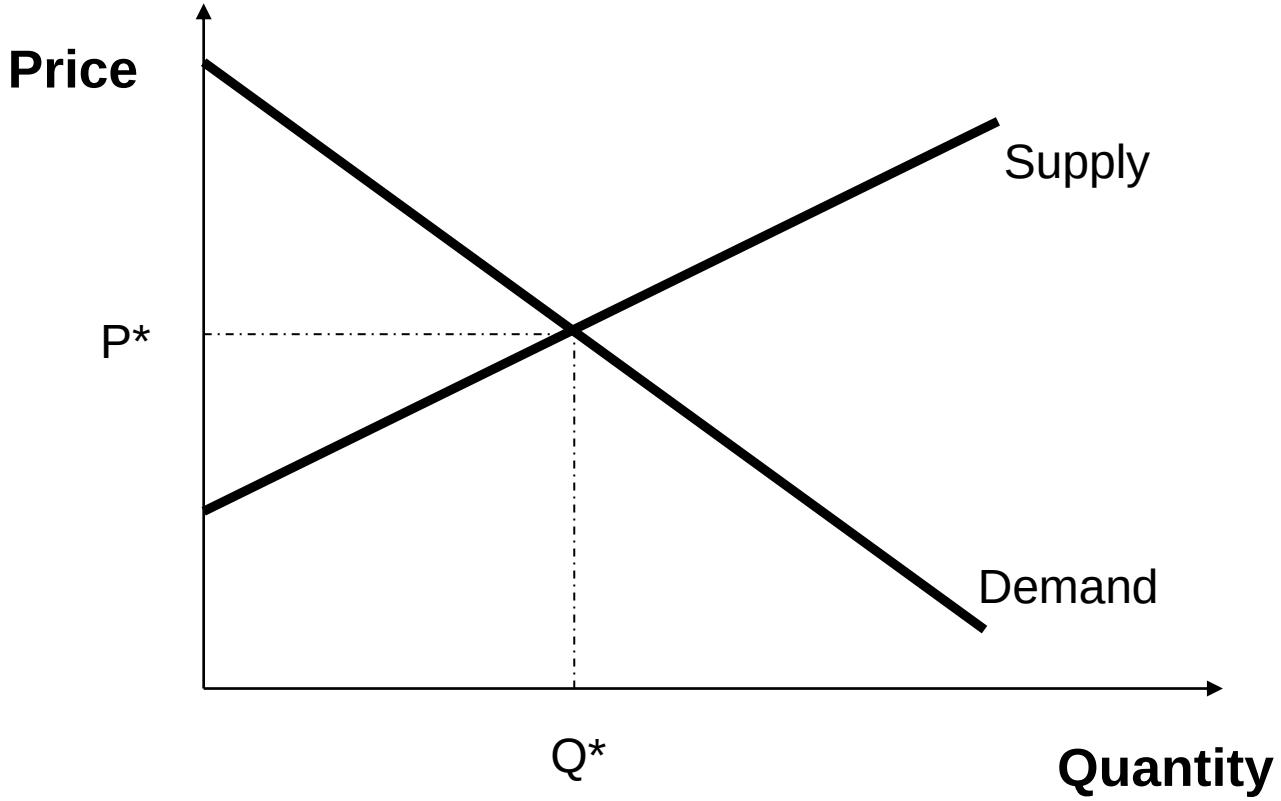


Producers' surplus is the aggregate difference between the price that sellers receive and their reservation prices



Total surplus

= consumers' surplus + producers' surplus



Market equilibrium results in largest total surplus

- all mutually beneficial opportunities for exchange are exploited

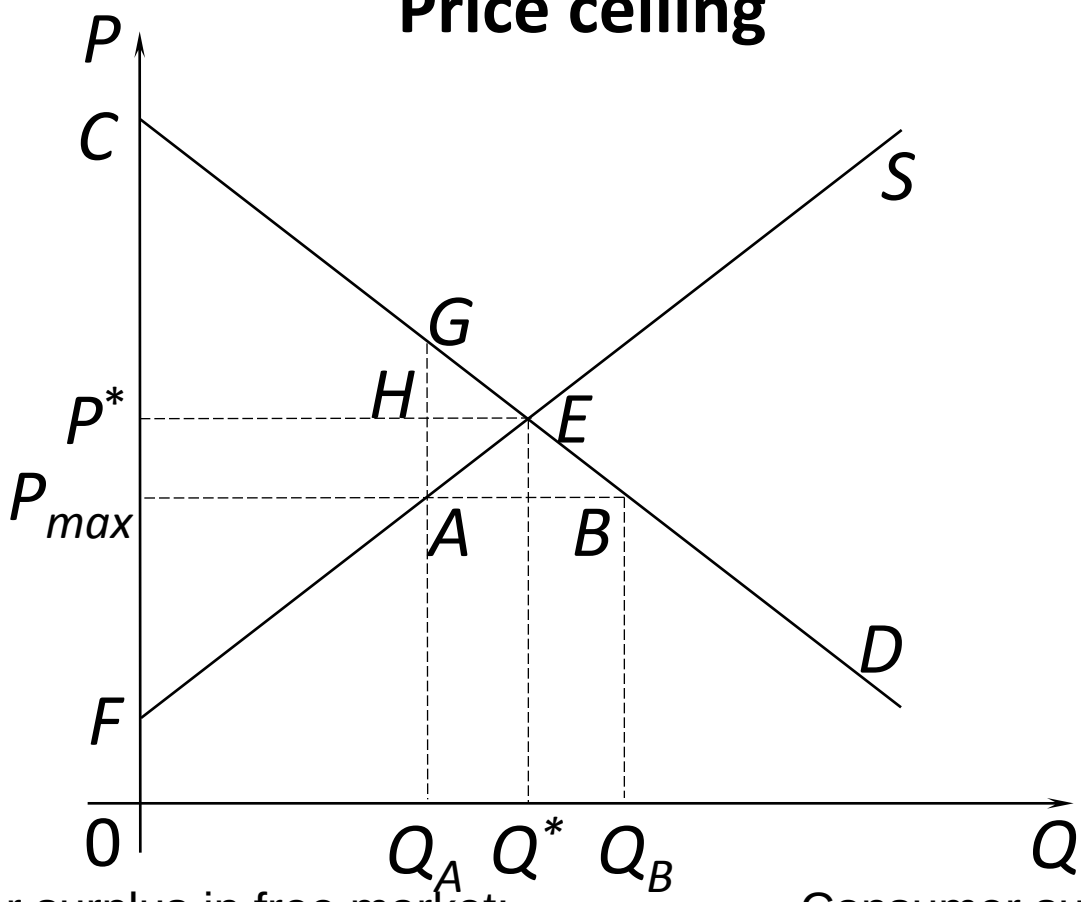
Price Controls

Price ceiling – a maximum allowable price, specified by law.

Price floor – a minimum allowable price, specified by law (example: minimum wage).

In presence of controls, the quantity traded is the smaller of quantity supplied and quantity demanded.

Price ceiling



Consumer surplus in free market:

S_{p^*CE}

Consumer surplus with price ceiling:

$S_{p_{max}CGA}$

Producer surplus in free market:

S_{p^*EF}

Producer surplus with price ceiling :

$S_{p_{max}AF}$

Social welfare in free market:

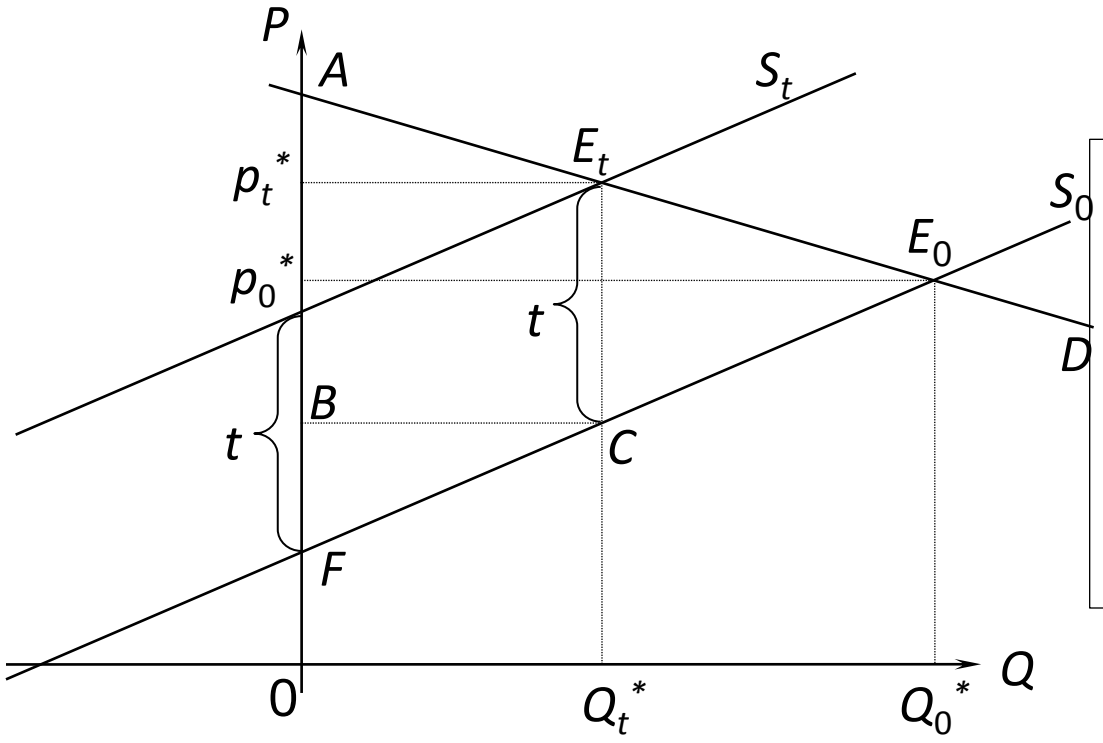
S_{CEF}

Dead weight loss: S_{GAE}

Social welfare with price ceiling :

S_{CGAF}

Unit tax and market equilibrium



A fixed amount of money is to be transferred to budget for every unit of good sold

P_0^* – price without tax

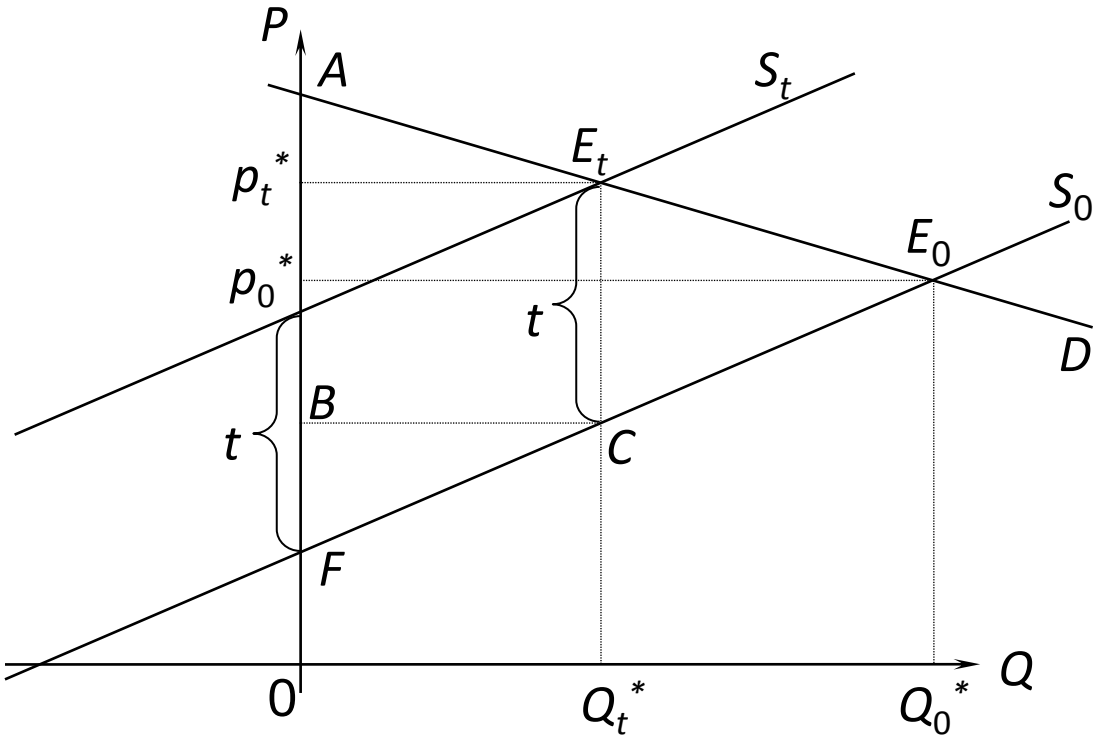
Q_0^* – quantity demanded and supplied without tax

B – price received by producers

P_t^* – price paid by consumers when tax is imposed

Q_t^* – quantity demanded and supplied when tax is imposed

Unit tax and market equilibrium: welfare effects

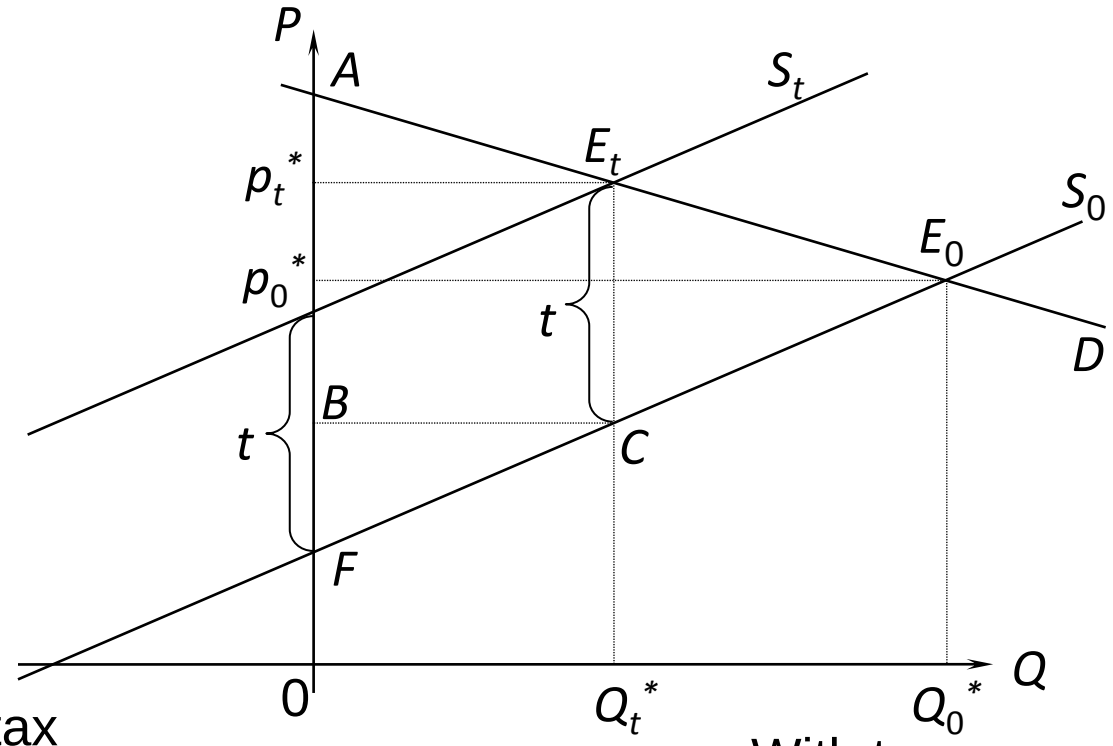


Consumer surplus without tax: $CS_0 = S_{Ap_0^*E_0}$

Consumer surplus with tax: $CS_t = S_{Ap_t^*E_t}$

Change in consumer surplus: $\Delta CS = S_{p_0^*p_t^*E_tE_0}$

Unit tax and market equilibrium: welfare effects



Without tax

Cost : $C_0 = S_{0FE_0Q_0^*}$

Total revenue : $TR_0 = S_{0p_0^*E_0Q_0^*}$

Producer surplus:

$PS_0 = TR_0 - C_0 = S_{Fp_0^*E_0}$

With tax

Cost : $C_t = S_{0FCQ_t^*}$

Total revenue: $TR_t = S_{0p_t^*E_tQ_t^*}$

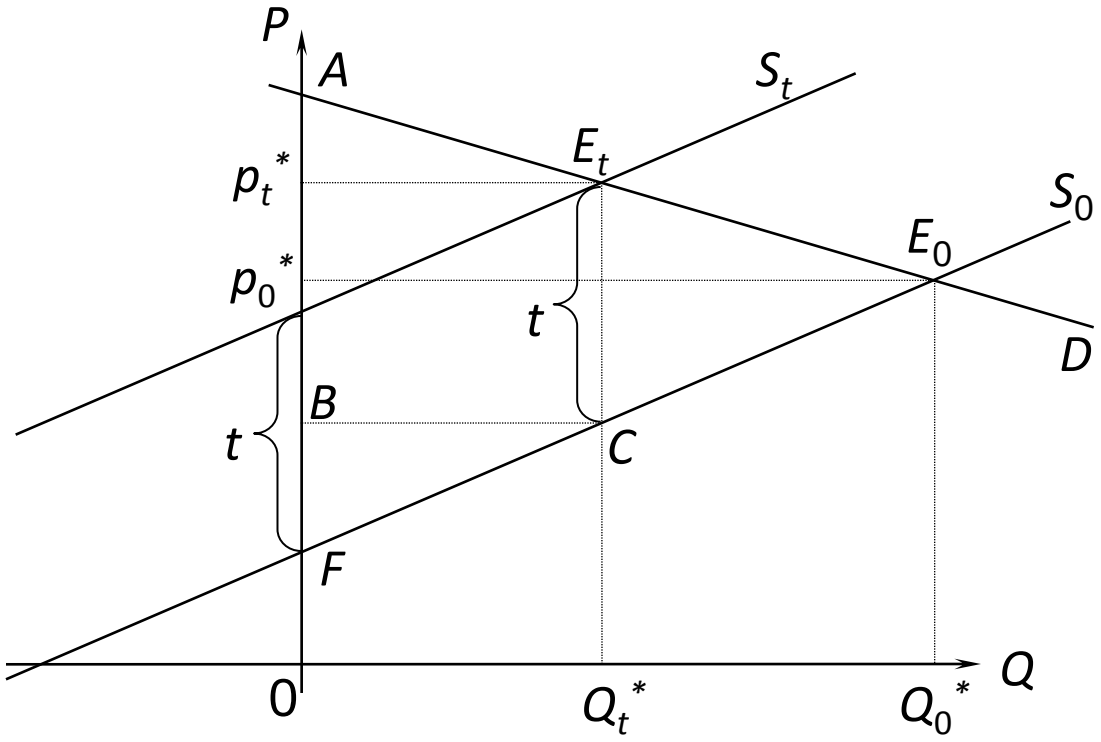
Tax paid: $T = S_{Bp_t^*E_tC}$

Producer surplus:

$PS_t = TR_t - C_t - T = S_{FBC}$

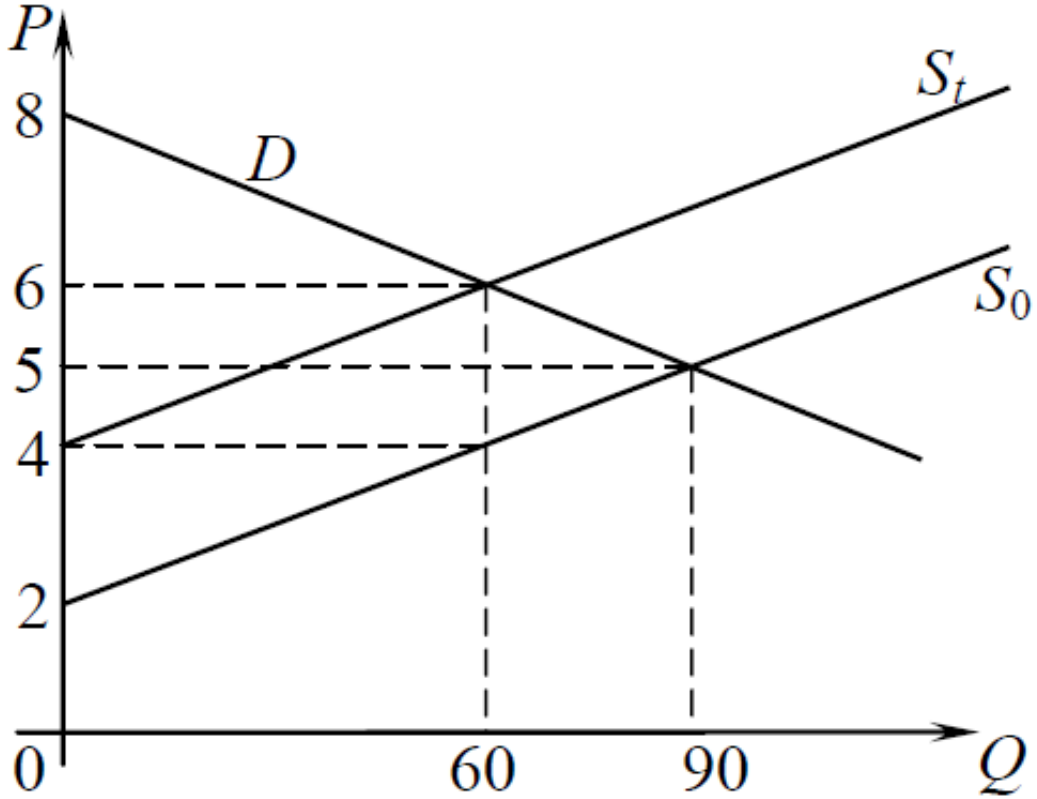
Change in producer surplus: $\Delta PS = S_{Bp_0^*E_0C}$

Per unit tax and market equilibrium: welfare effects



$$DWL = \Delta CS + \Delta PS - T = S_{CE_tE_0}$$

Unit tax: example (APT 2009)



(a) Calculate the producer surplus before tax.

(b) Now assume a per-unit tax of $2 is imposed whose impact is shown in the graph above.

1. Calculate the amount of tax revenue
2. What is the after-tax price that the sellers now keep?
3. Calculate the producer surplus after tax.