Welfare Analysis – Surplus, Efficiency, and Deadweight Loss

Topic 5

Learning Objectives

Construct measures of the benefits of trade to answer the following questions:

- How much does a buyer gain from trading?
- How much does a seller gain from trading?
- How much do buyers and sellers collectively gain from trade?
- How much does society as a whole benefit from trade?

Revision

- Buyer's reservation price
- Seller's reservation price
- Willingness to pay
- For both buyers and sellers, the reservation price represents a cut-off price above and below which behavior in the market place differs.

Consumer and Producer Surplus

- A market demand function can be thought of as a line-up of consumers according to their willingness to pay from highest to lowest.

- The willingness to pay reflects the consumer's marginal benefit.

- A market supply function can be thought of as a line-up of producers (firms) according to their reservation price from lowest to highest.

- A firm's reservation price is loosely speaking the price they have to charge to cover marginal operational costs.
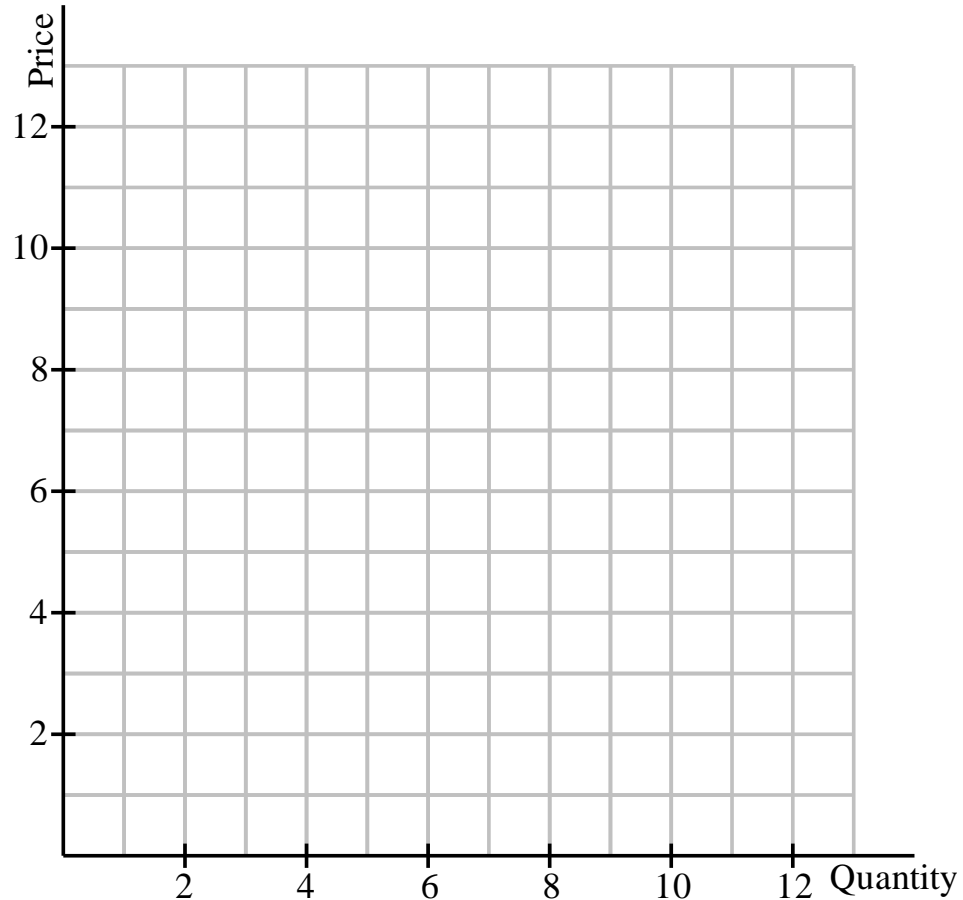
Consumer and Producer Surplus – Ctd.

- Some consumers have a willingness to pay greater than the equilibrium price, they then get consumer surplus (CS).

- Some companies have a reservation price that is smaller than the equilibrium price, they then get producer surplus (PS).

- CS + PS = Welfare (W)

- Society's welfare is maximized where consumers marginal benefit is equal to firms' marginal cost.

Consumer Surplus, Producer Surplus, and Welfare
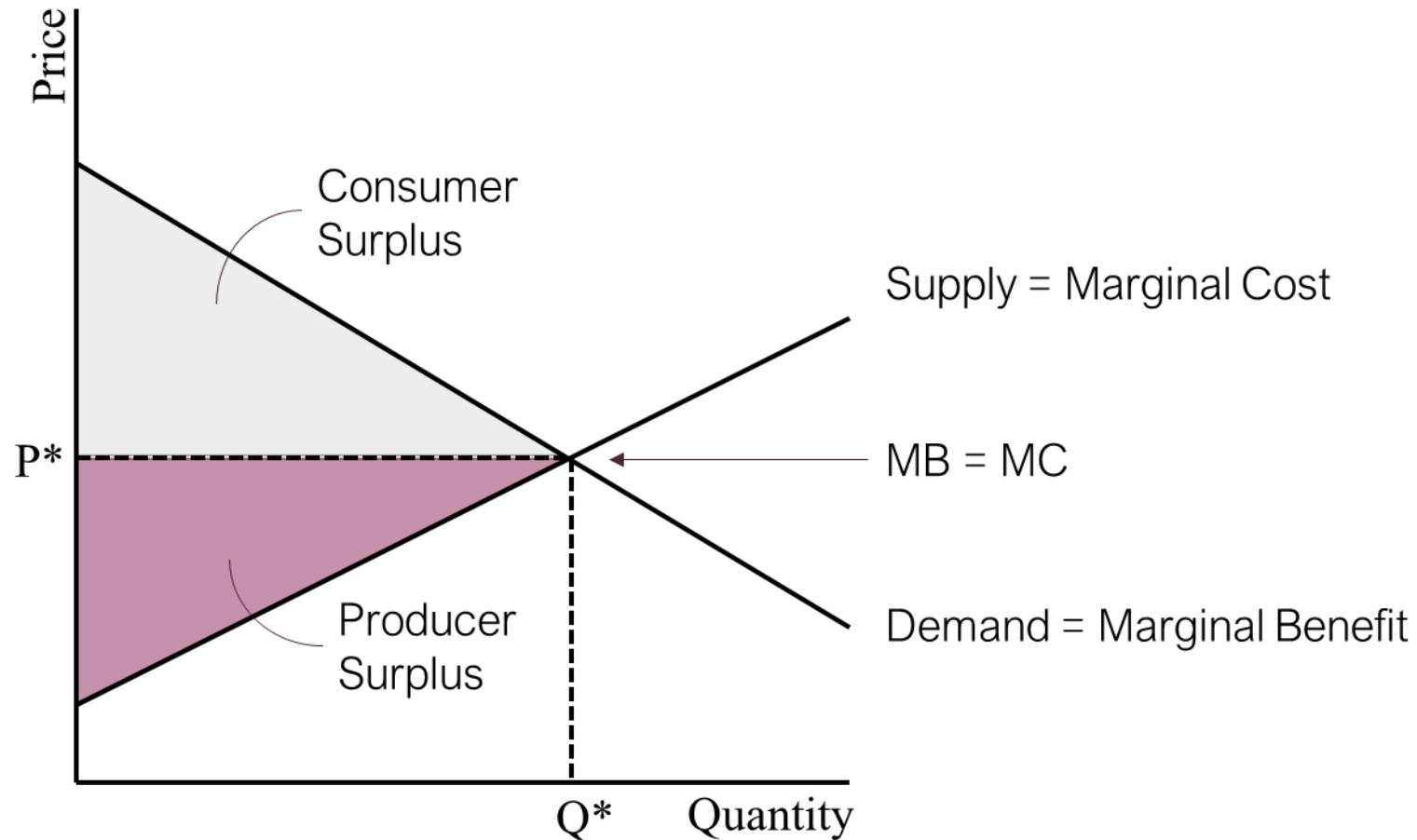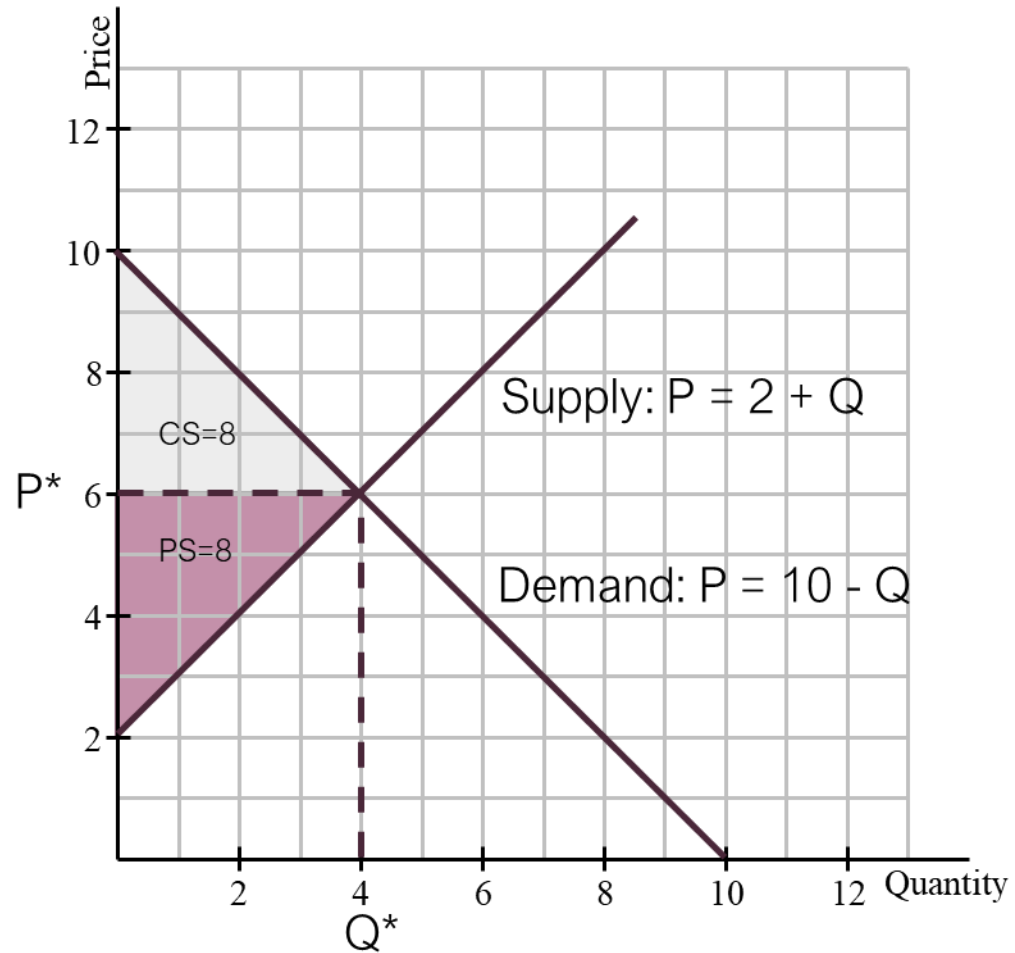
Welfare Analysis - A Numerical Example

Supply: Q = -2 + P

Demand: Q = 10 - P

Parameter	Value
Price	
Quantity turned over	
CS	
PS	
Welfare	

Welfare Analysis – Ctd.
A Numerical Example

Parameter	Value
Price	6
Quantity turned over	4
CS	8
PS	8
Welfare	16

Welfare Analysis of a Price Floor
A Numerical Example
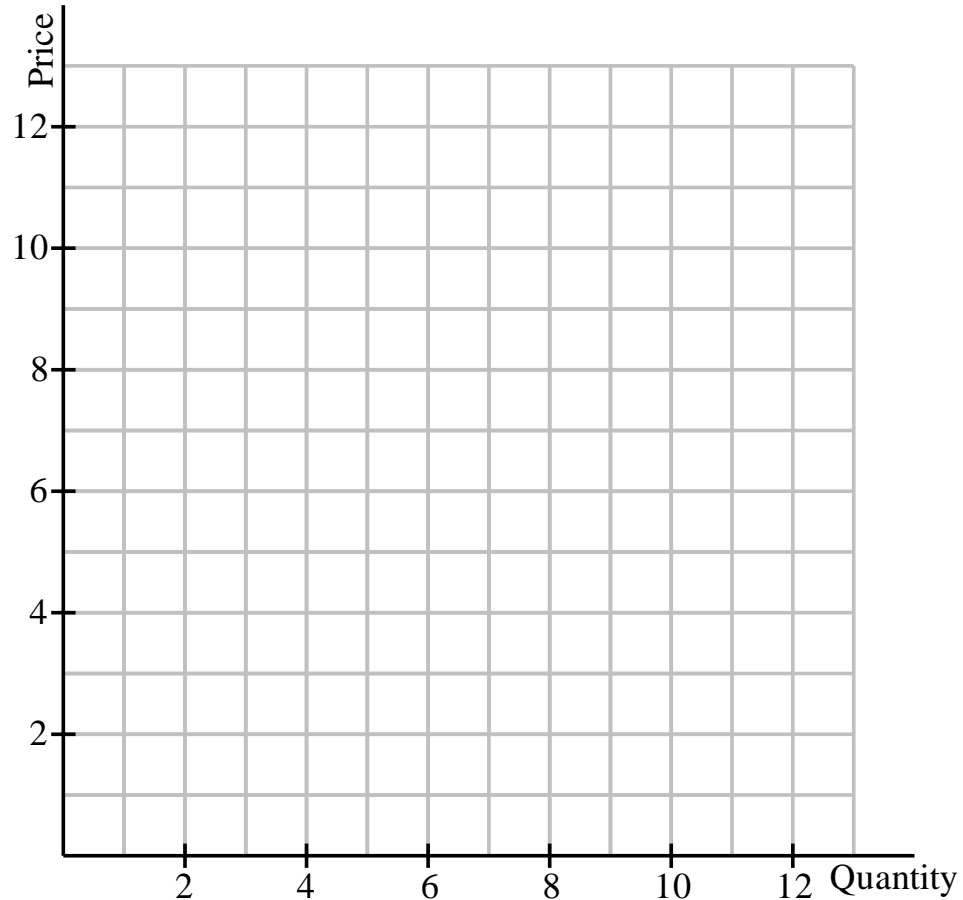
Supply: Q = -2 + P

Demand: Q = 10 - P

Parameter	Value
Price Floor	8
Quantity turned over	
CS	
PS	
Welfare	

Welfare Analysis of a Price Floor – Ctd.
A Numerical Example
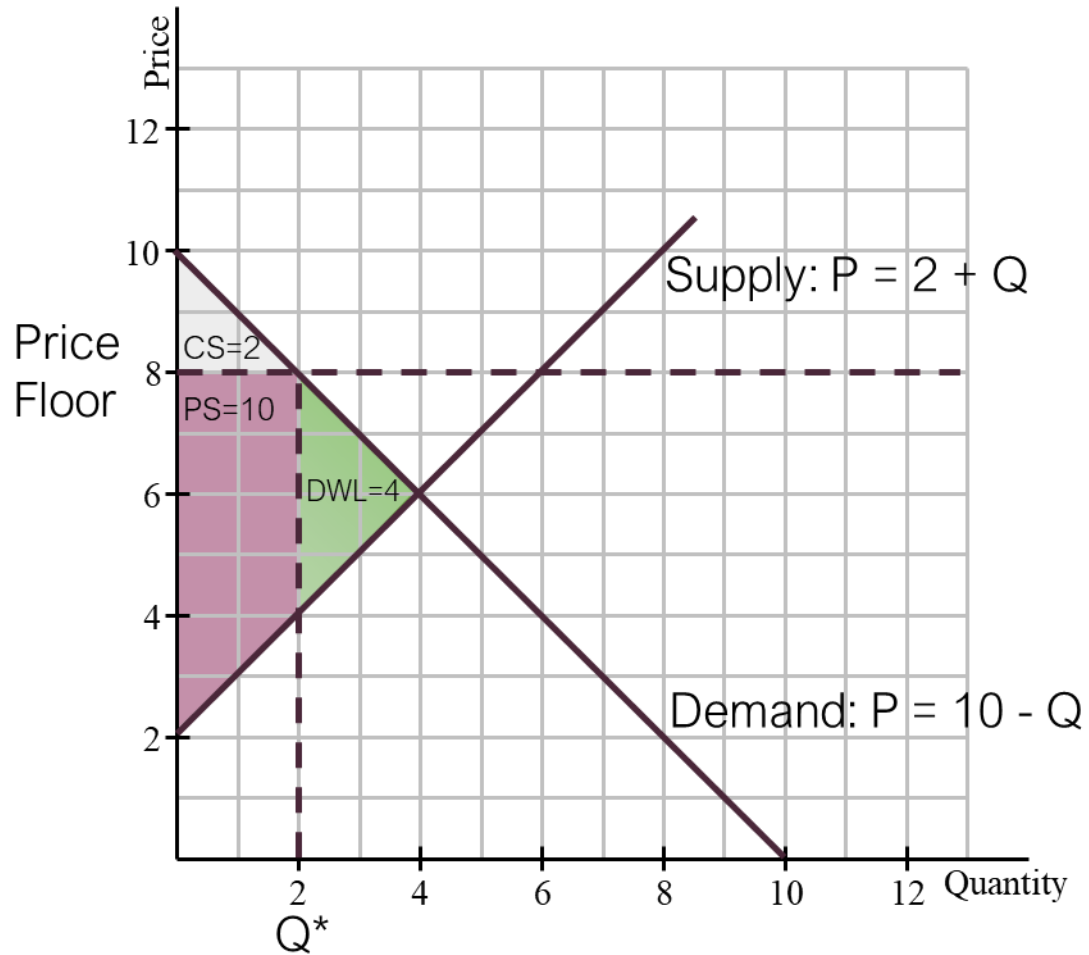
Parameter	Value
Price Floor	8
Quantity turned over	2 (-2)
CS	2 (-6)
PS	10 (+2)
Welfare	12 (-4)

Welfare Analysis of a Price Ceiling
A Numerical Example
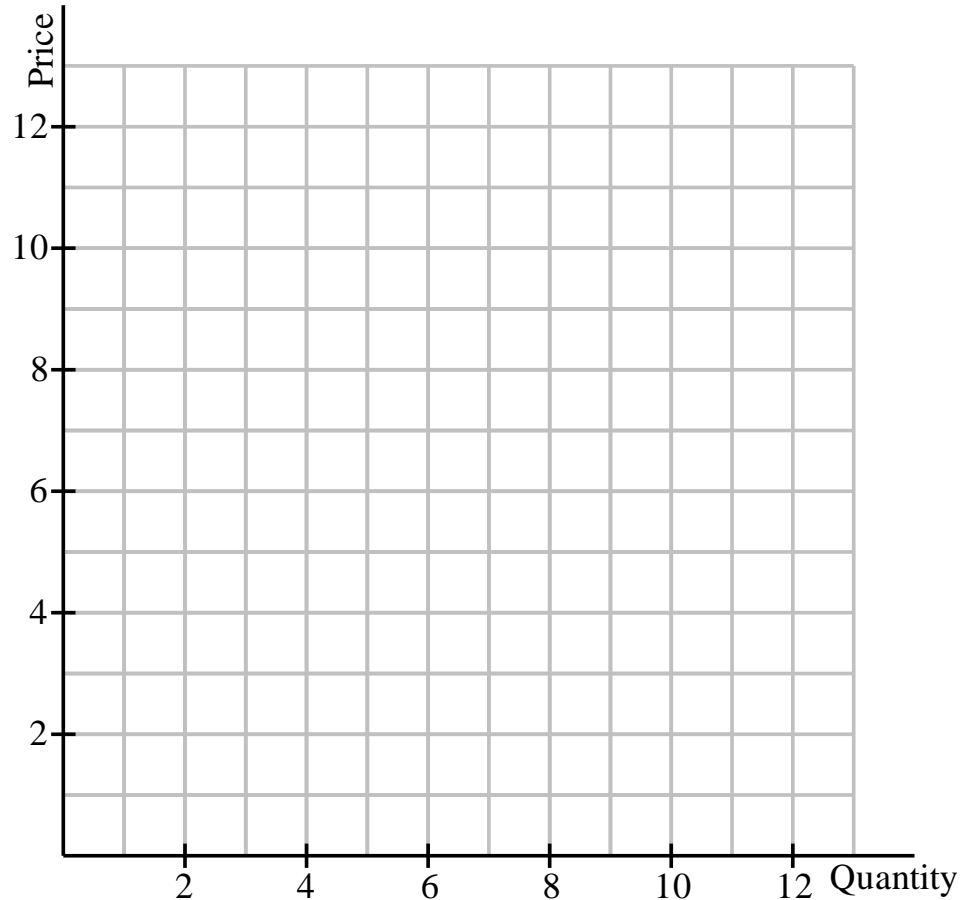
Supply: Q = -2 + P

Demand: Q = 10 - P

Parameter	Value
Price Ceiling	4
Quantity turned over	
CS	
PS	
Welfare	

Welfare Analysis of a Price Ceiling – Ctd. A Numerical Example
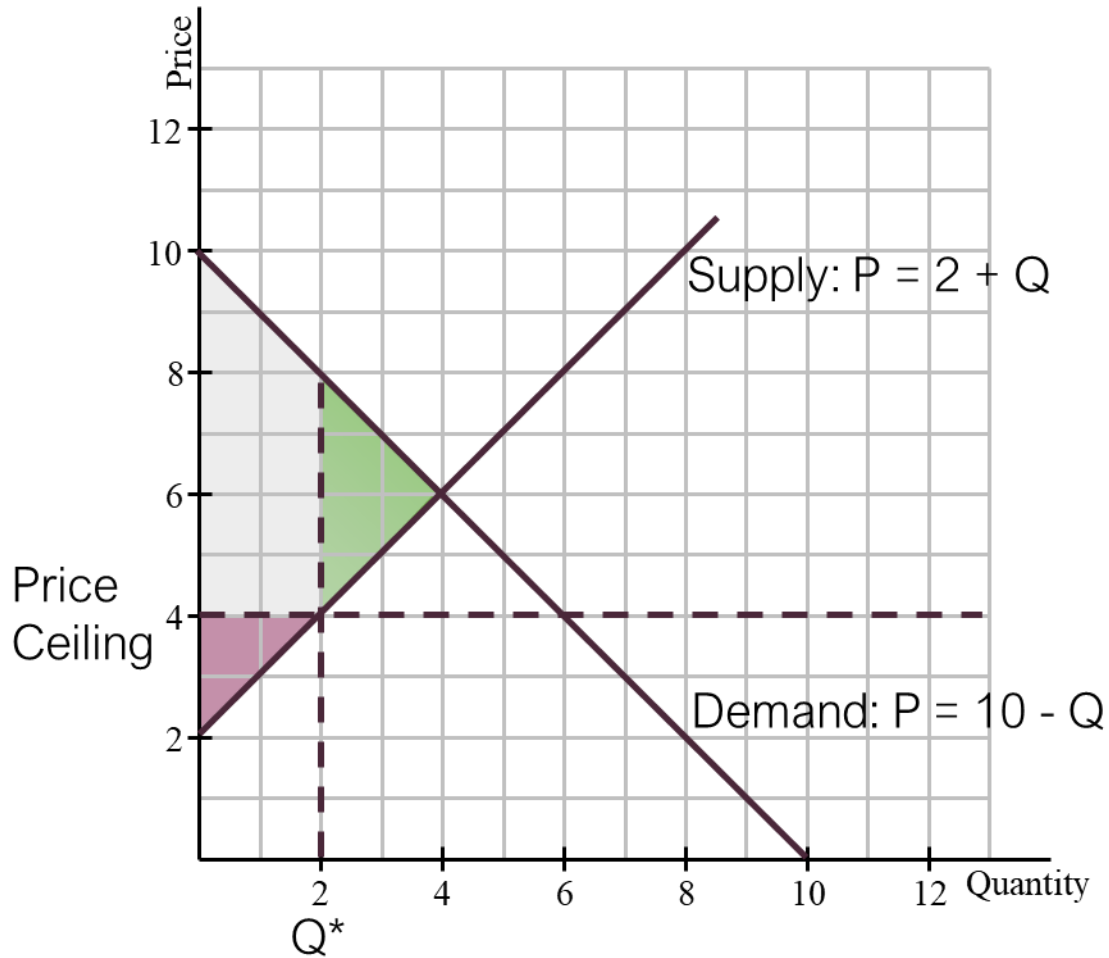
Parameter	Value
Price Ceiling	4
Quantity turned over	2 (-2)
CS	10 (+2)
PS	2 (-6)
Welfare	12 (-4)

Welfare Analysis of a Tax
A Numerical Example

Price

12 –

10 –

8 –

6 –

4 –

2 –

2   4   6   8   10   12   Quantity
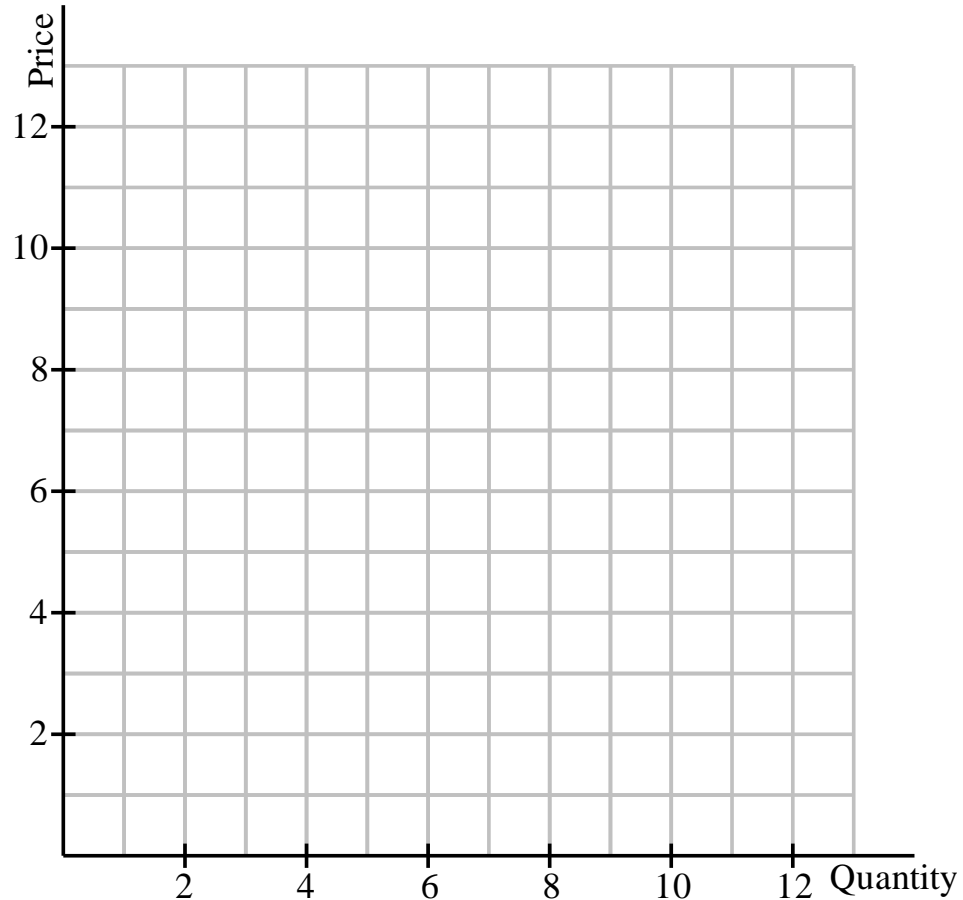
Supply: Q = -2 + P

Demand: Q = 10 - P

Parameter	Value
Price with Tax = 2	
Quantity turned over	
CS	
PS	
Tax Revenue	
Welfare	

Welfare Analysis of a Tax – Ctd.
A Numerical Example
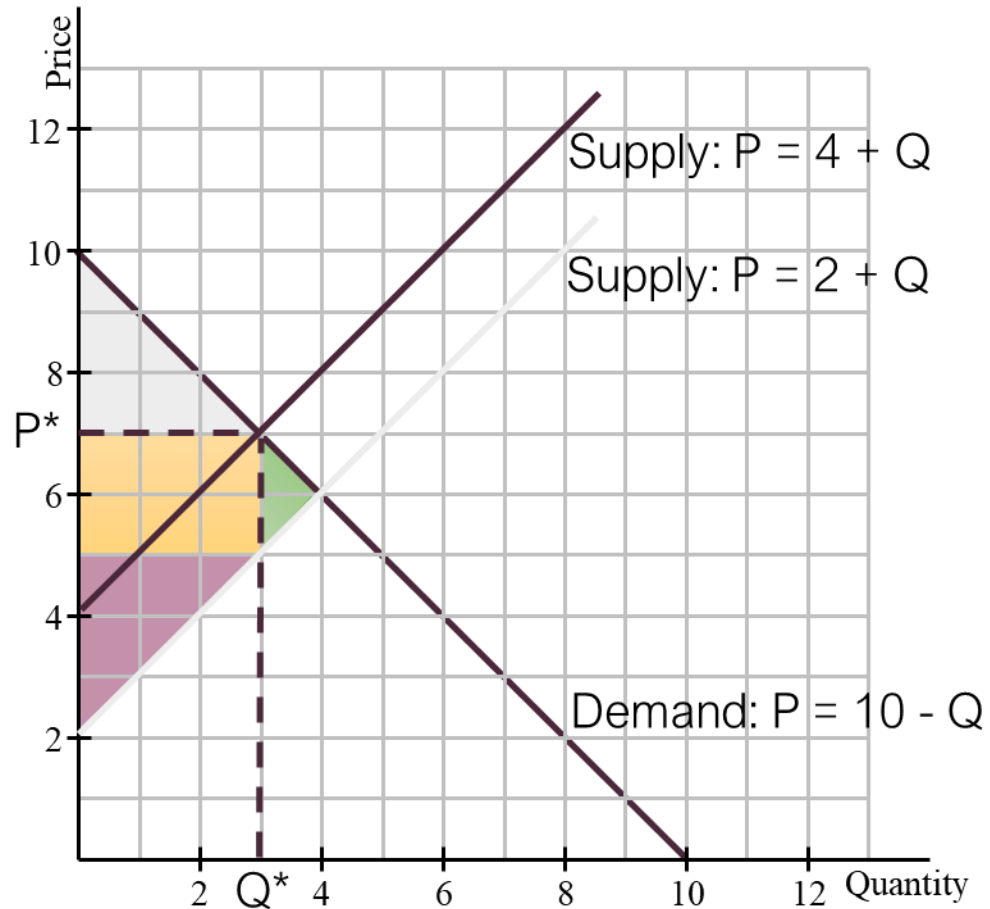
Parameter		Value
Price with T=2		7
Quantity turned over		3 (-1)
CS	⚪	4.5 (-3.5)
PS	🟣	4.5 (-3.5)
Tax Revenue	🟡	6
Welfare		15 (-1)

Welfare Analysis of a Subsidy
A Numerical Example

Supply: Q = -2 + P

Demand: Q = 10 - P

Parameter	Value
Price with Subsidy = 2	
Quantity turned over	
CS	
PS	
Cost of Subsidy	
Welfare	

Welfare Analysis of a Subsidy – Ctd.
A Numerical Example
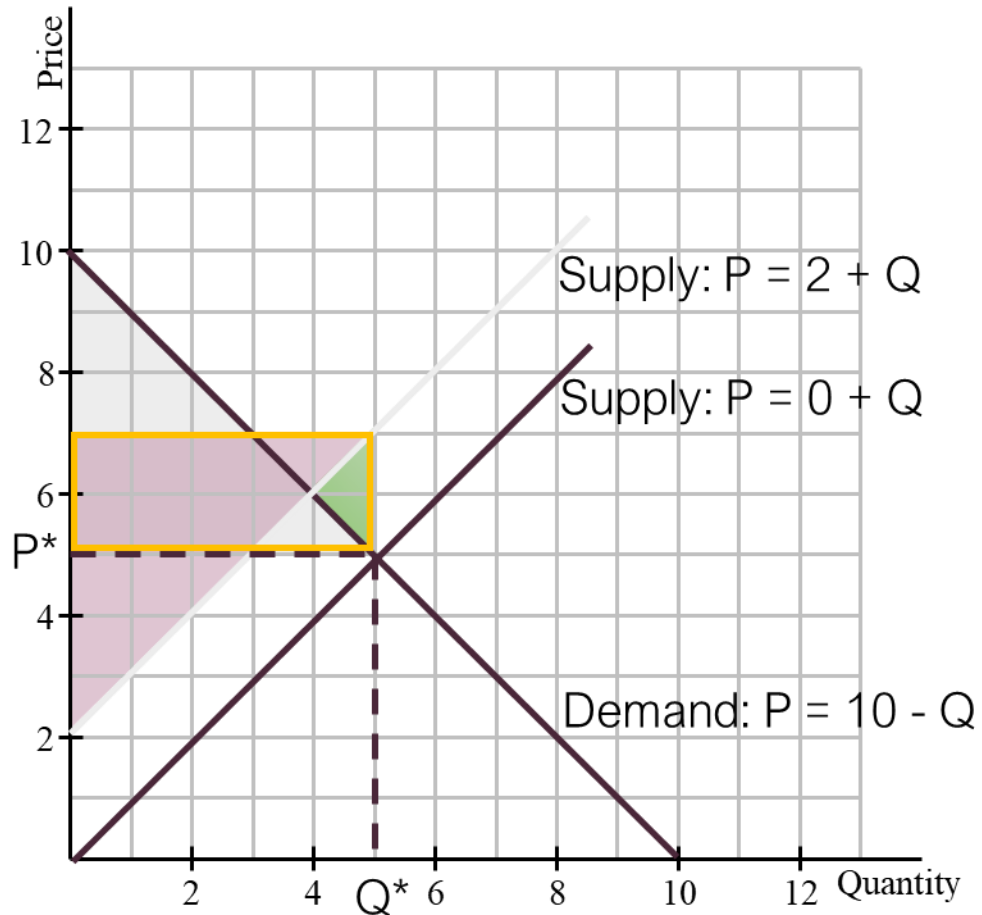
Parameter		Value
Price with S=2		5
Quantity turned over		5 (+1)
CS	○	12.5 (+4.5)
PS	●	12.5 (+4.5)
Cost of Subsidy	●	10
Welfare		15 (-1)

Allocation vs. Redistribution

Figure: Supply and demand graph. Supply: P = 2 + Q. Demand: P = 10 - Q. Price Floor at P = 8 (dashed line). Q* = 2. Labels: CS=2, PS=10, DWL=4.
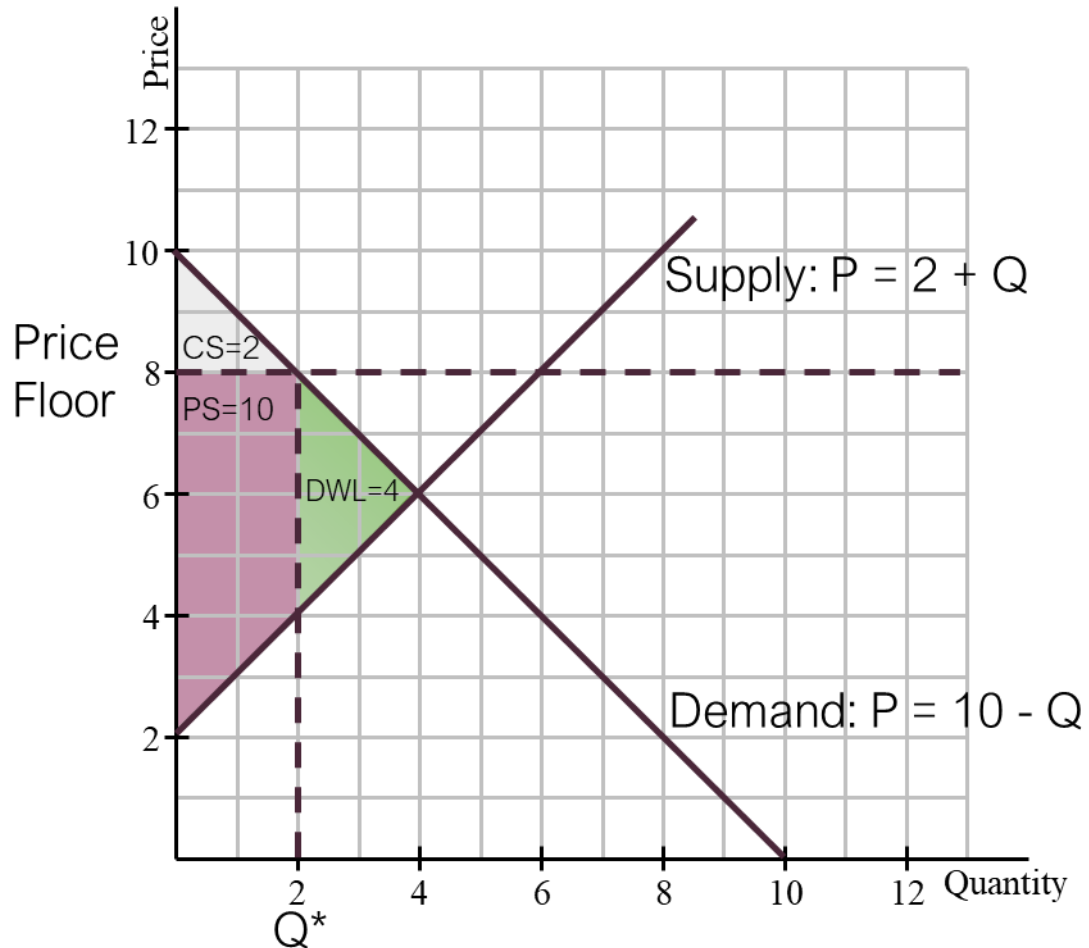
Parameter	Free Market	Minimum Wage
Equilibrium Price	6	
Minimum Wage	-	8
Quantity turned over	4	2 (-2)
CS	8	2 (-6)
PS	8	10 (+2)
Welfare	16	12 (-4)

Contemporary Application

- In 1990, the central planner systems collapsed in large parts of Central and Eastern Europe.
- One major reason for their collapse was the rejection of the price mechanism to allocate scarce resources.
- In competitive markets, sovereign consumers and producers interact with each other until no producer with a reservation price is left that is below a consumer's willingness to pay and markets clear.
- Because of the checks of competition, no consumer has an incentive to understate their willingness to pay and no producer an incentive to overstate their reservation price (willingness to sell).
- In a central planner economy, there are no sovereign consumers and producers who interact decentrally and freely with each other.
- Instead, in a central plan every worker is asked: How much do we have to pay you to work and how much are you willing to pay for what is collectively produced?
- People will then naturally overstate their reservation price to work and understate their willingness to pay, causing prices to be distorted from the very onset of economic activity.

Summary

- Economics is concerned with three questions :
  - What to produce?
  - How to produce?
  - Who gets what is being produced?
- In a competitive market system, sovereign consumers articulate their wants that maximize their utility, sovereign producers satisfy them at the least cost to maximize their profits, and the market assures that as long as consumers' willingness to pay is above and producers' reservation price below the market price, consumers get what they want in the allocatively most efficient and welfare-maximizing way.
- Thus, perfectly competitive markets solve the economic problem and people generate income from solving it.

Summary – Ctd.

- Markets maximize welfare.

- Market distortion creates dead weight loss.

- For markets to work a set of institutional arrangements such as secure private property and freedom of contract are essential.

- When it comes to redistribution, economists advocate the principle: Allocation comes before redistribution.