Welfare Analysis

- An extension of the supply and demand framework:
  - It is a tool that helps us evaluate the desirability of market outcomes.
- It is a tool that we will use over and over:
  - To evaluate the effects of government intervention.
  - To understand market failures.

I. Concept of Economic Surplus

Economic Surplus

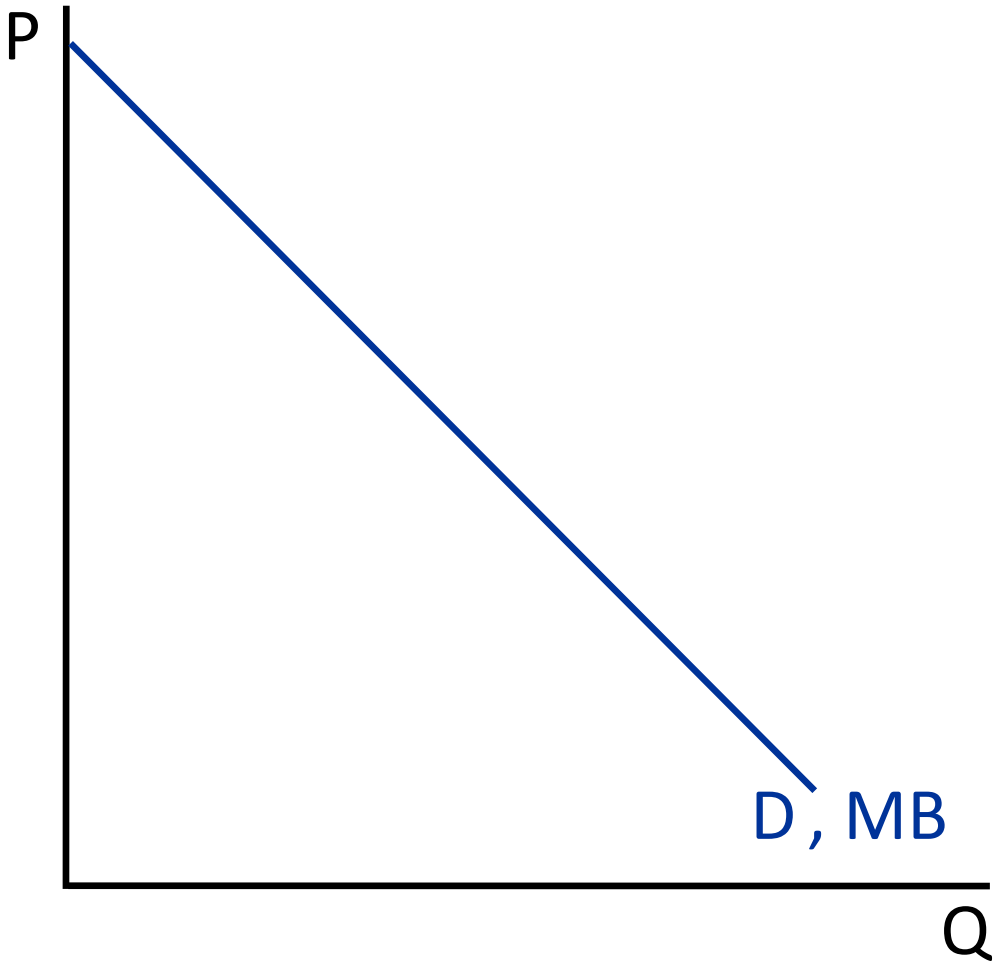
Economic surplus represents the net gains to society from all trades that are made in a particular market, and it consists of two components: consumer and producer surplus.

- **Consumer surplus:** The benefit that consumers derive from consuming a good, above and beyond the price paid for the good
- **Producer surplus:** The benefit producers derive from selling a good, above and beyond the cost of producing that good
- **Total economic surplus:** Consumer surplus + producer surplus

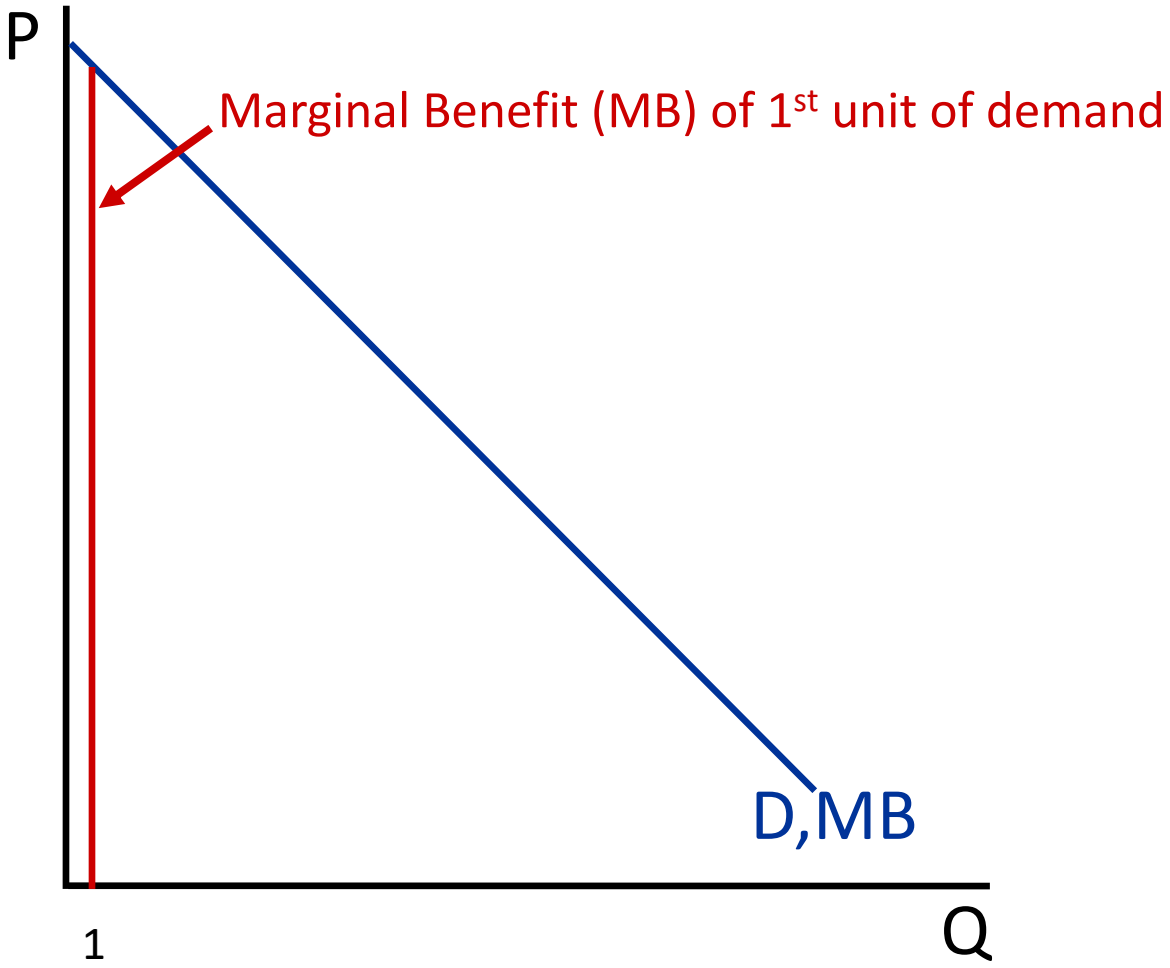
Marginal Benefit of Consumers

- The dollar value to consumers of another unit of a good.
- What they would be willing to pay for one more unit.
- The vertical distance of the demand curve gives the **marginal benefit** of an extra unit of good
- Demand curve can be read as:
  - Demand as a function of price: Q=D(P)
  - Marginal benefit of Q^{th} unit of good: P=MB(Q)

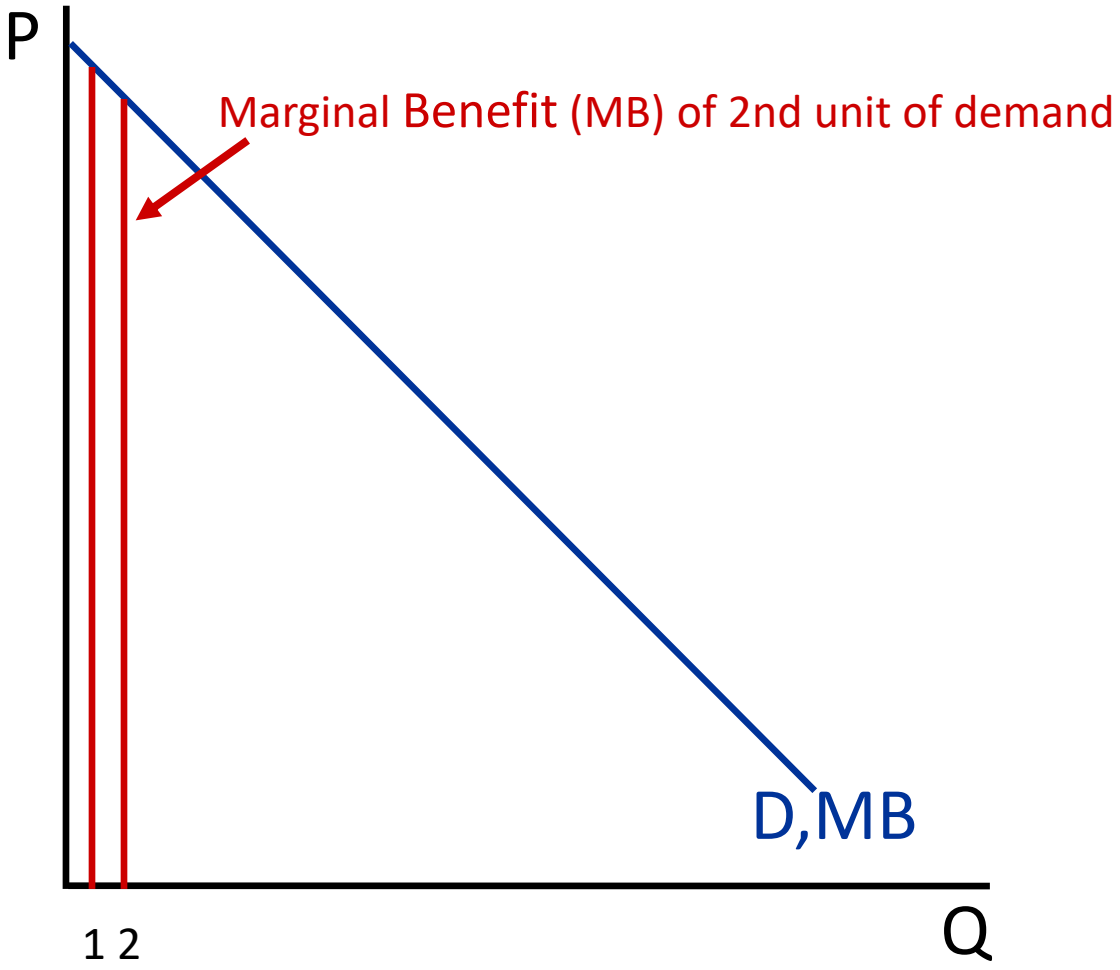
Demand for a given good



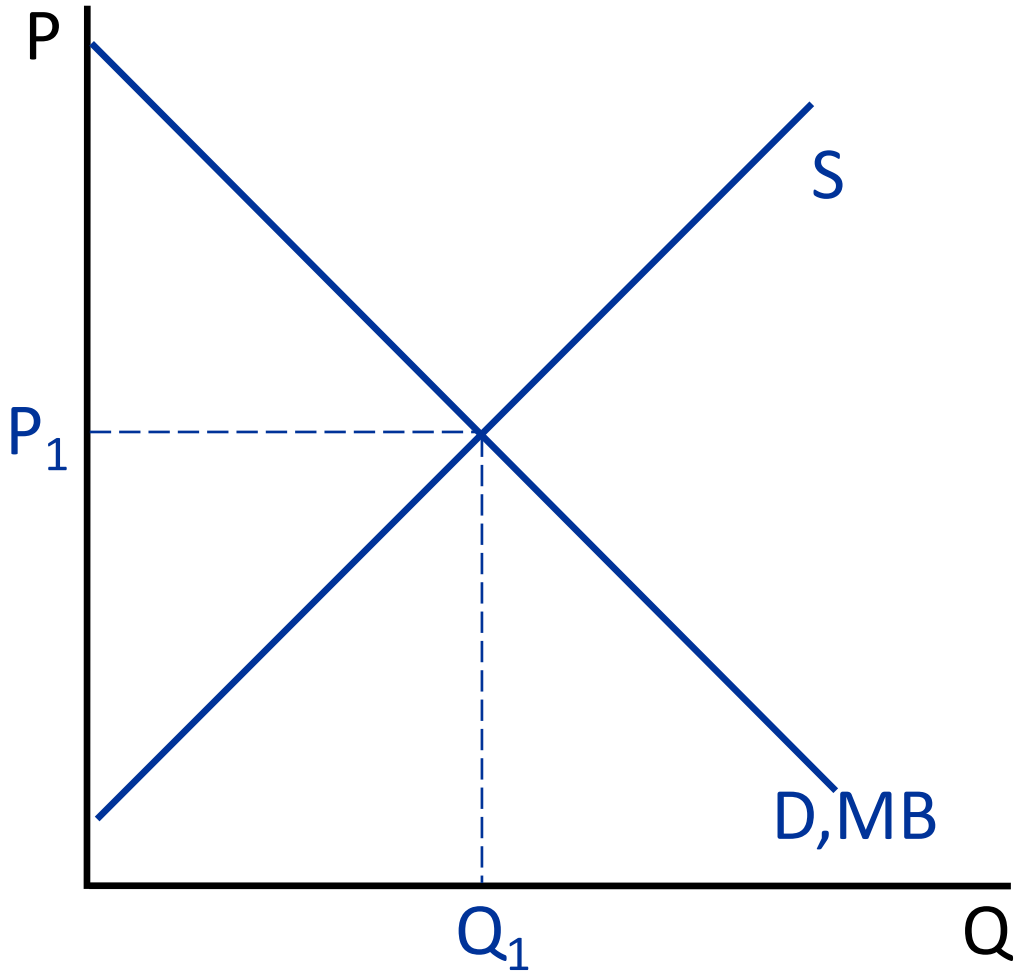
Consumer Surplus



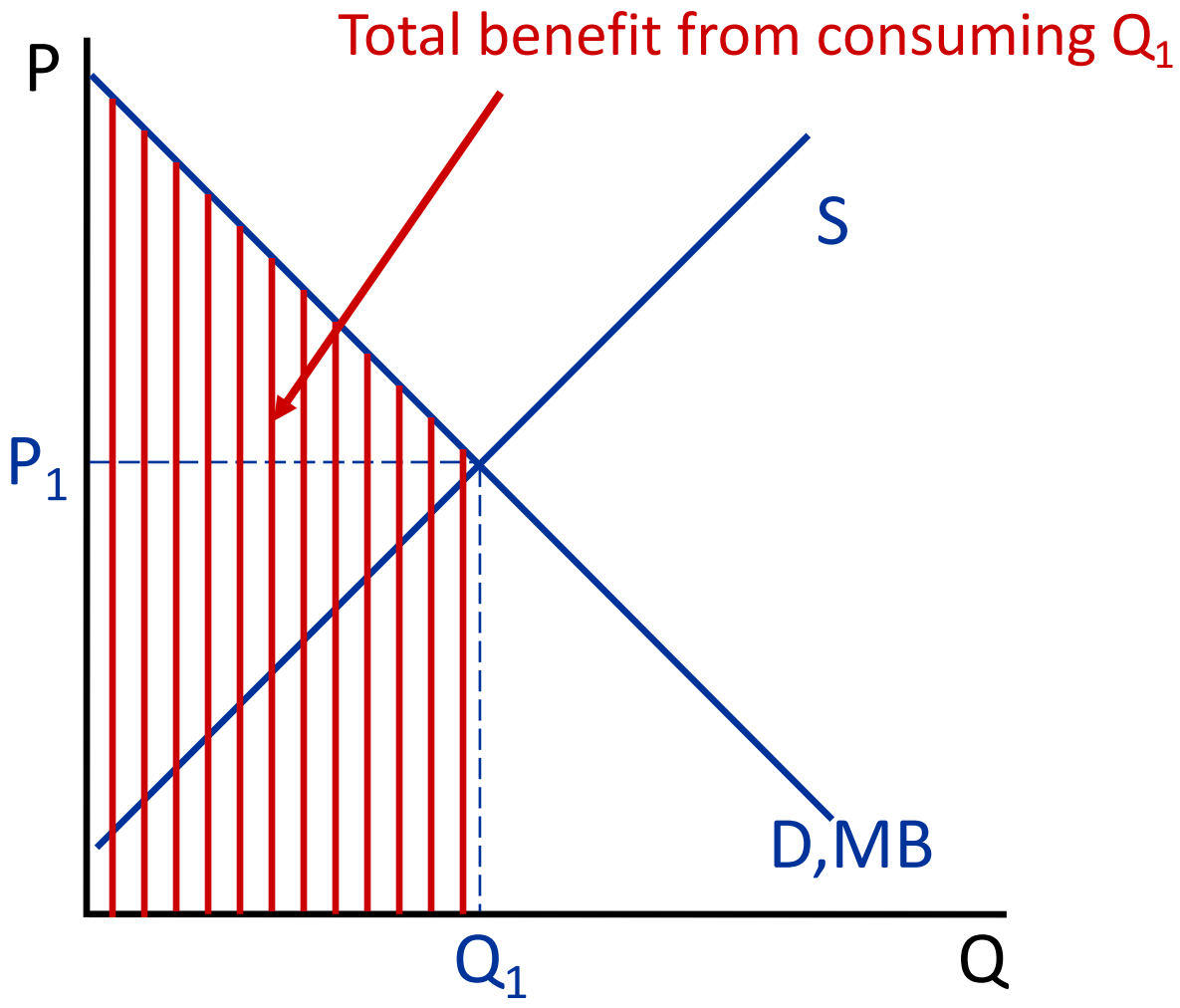
Consumer Surplus



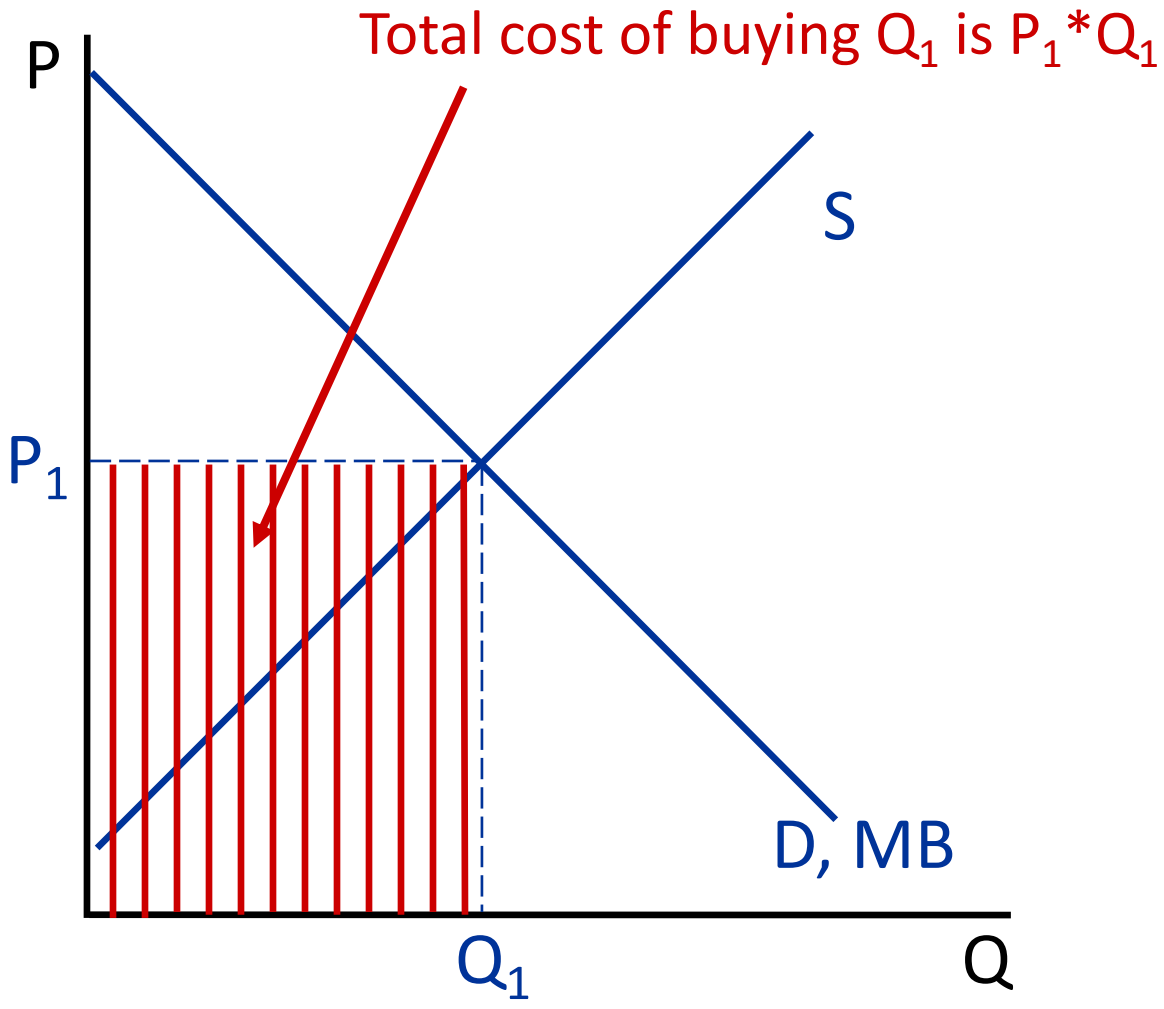
Consumer Surplus



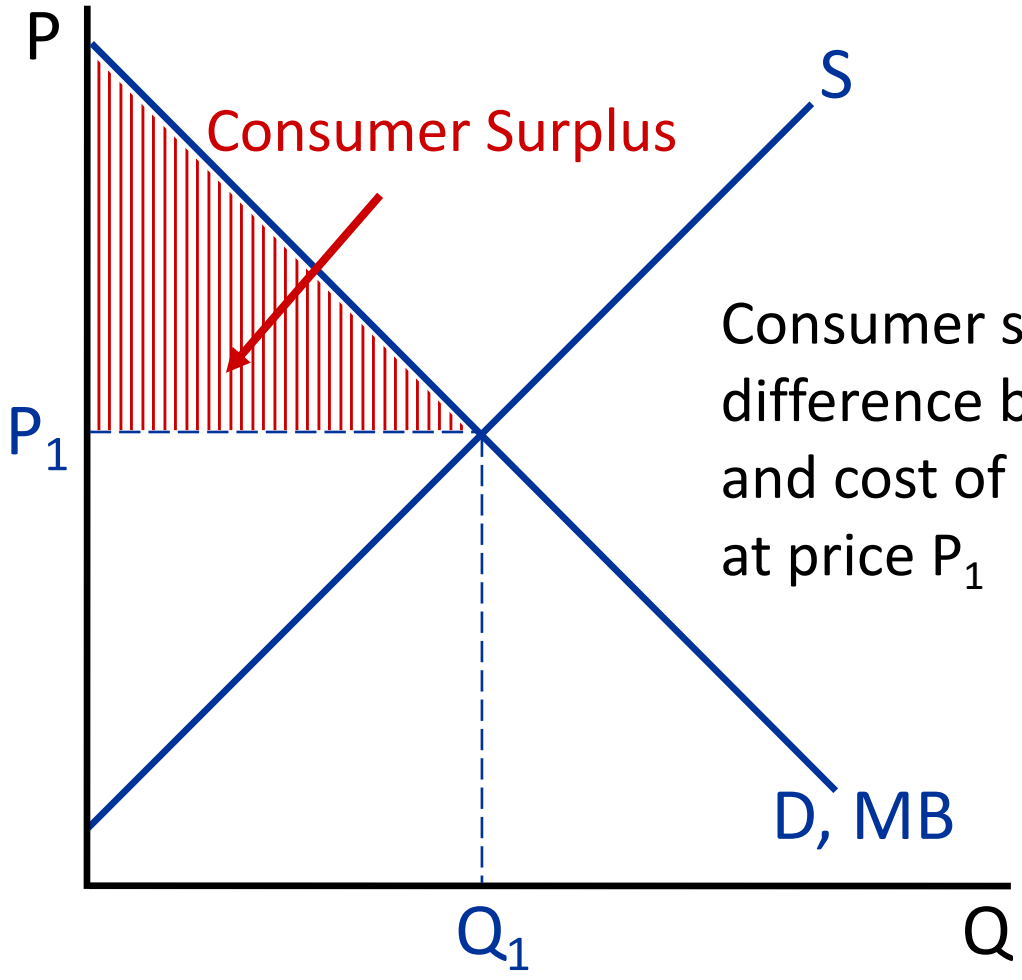
Consumer Surplus



Consumer Surplus



Consumer Surplus

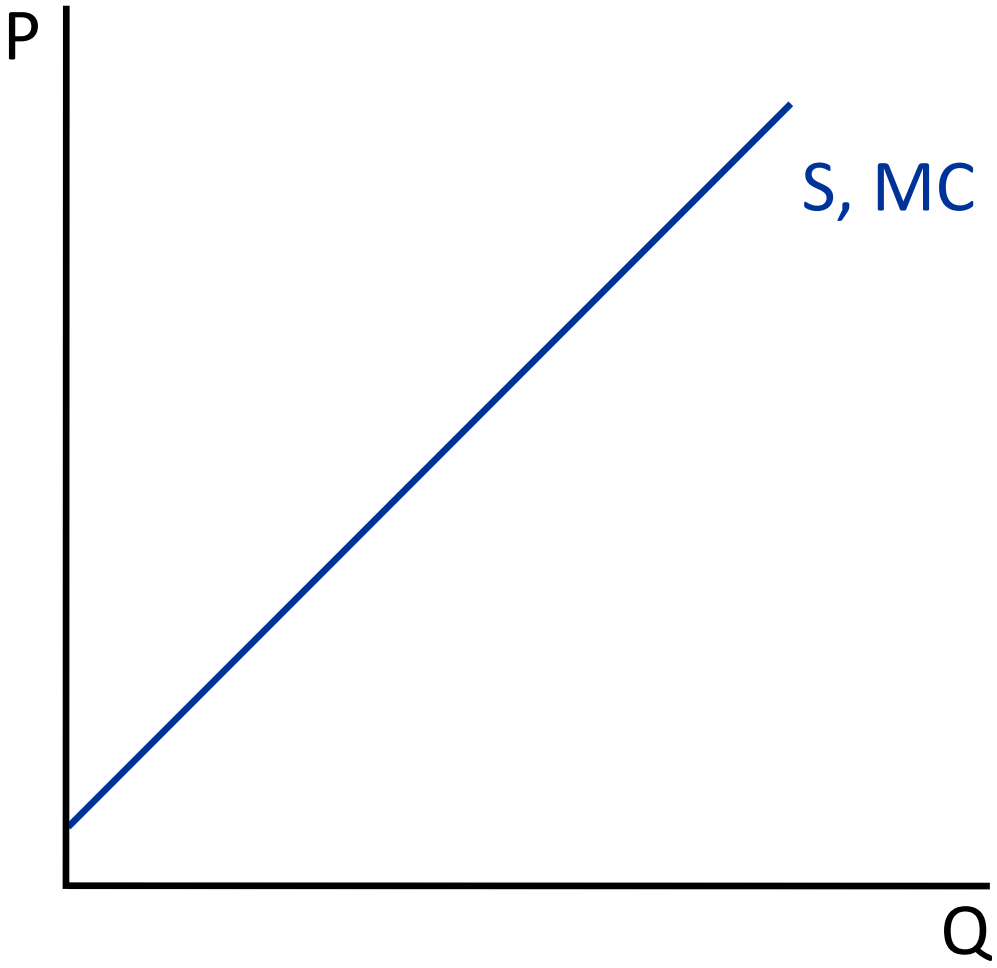


Consumer surplus is difference between benefit and cost of buying Q_1 units at price P_1

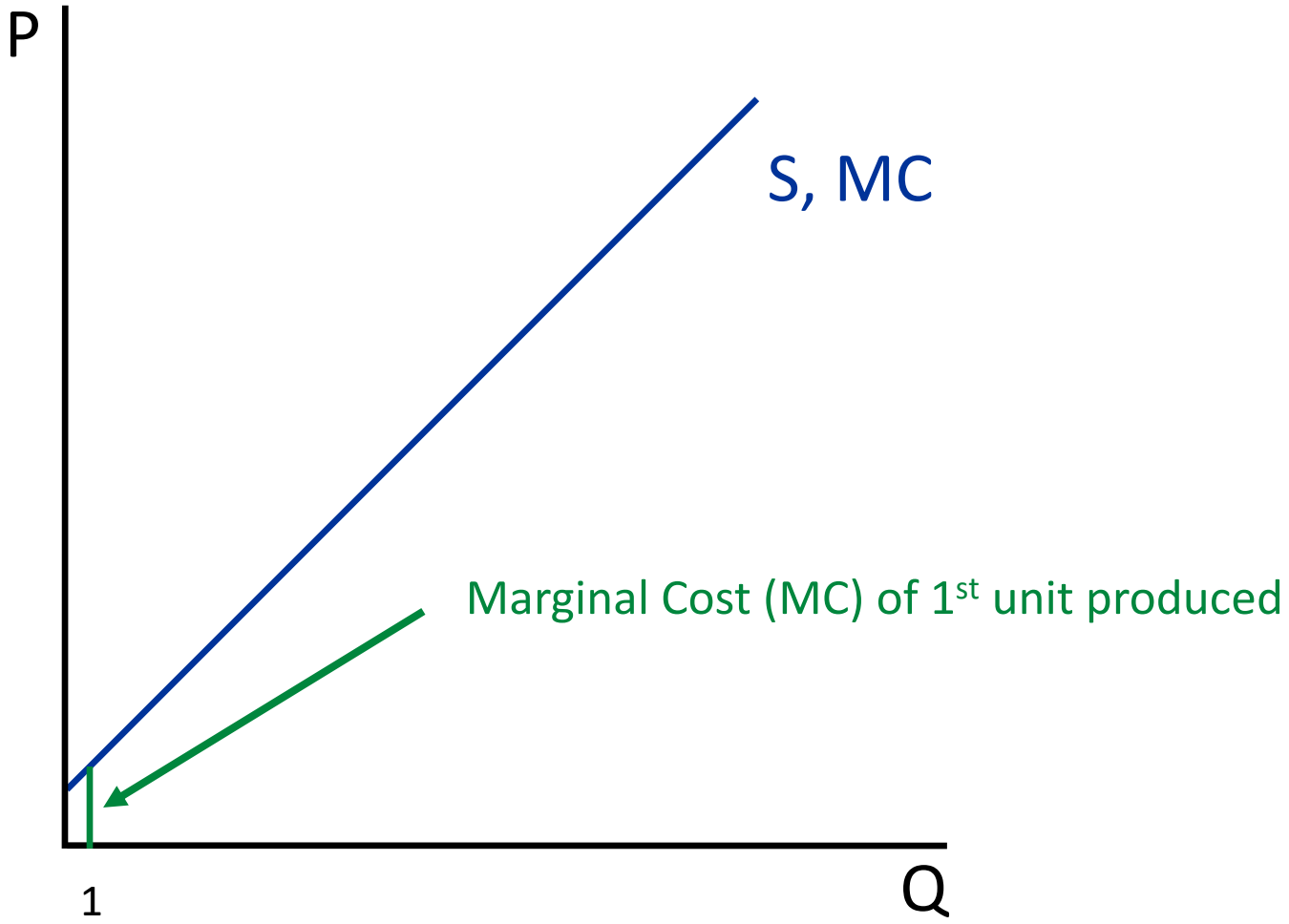
Marginal Cost of Producers

- The dollar cost to producers of producing another unit of a good.
- What they would be willing to sell for one more unit of production.
- The vertical distance of the supply curve gives the **marginal cost** of an extra unit of good produced
- Supply curve can be read as:
  - Supply as a function of price: Q=S(P)
  - Marginal cost of producing Q^{th} unit of good: P=MC(Q)

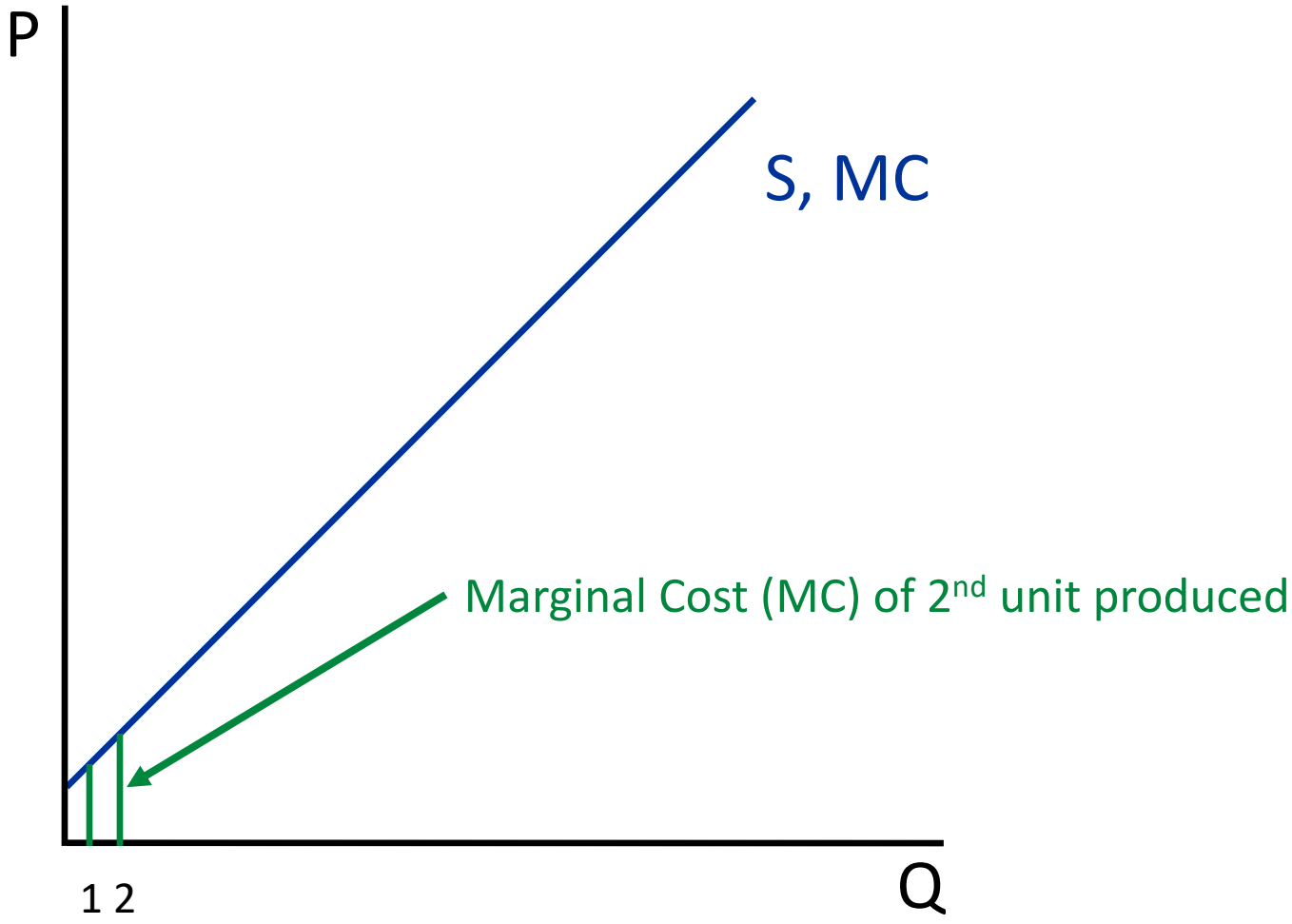
Supply of a given good



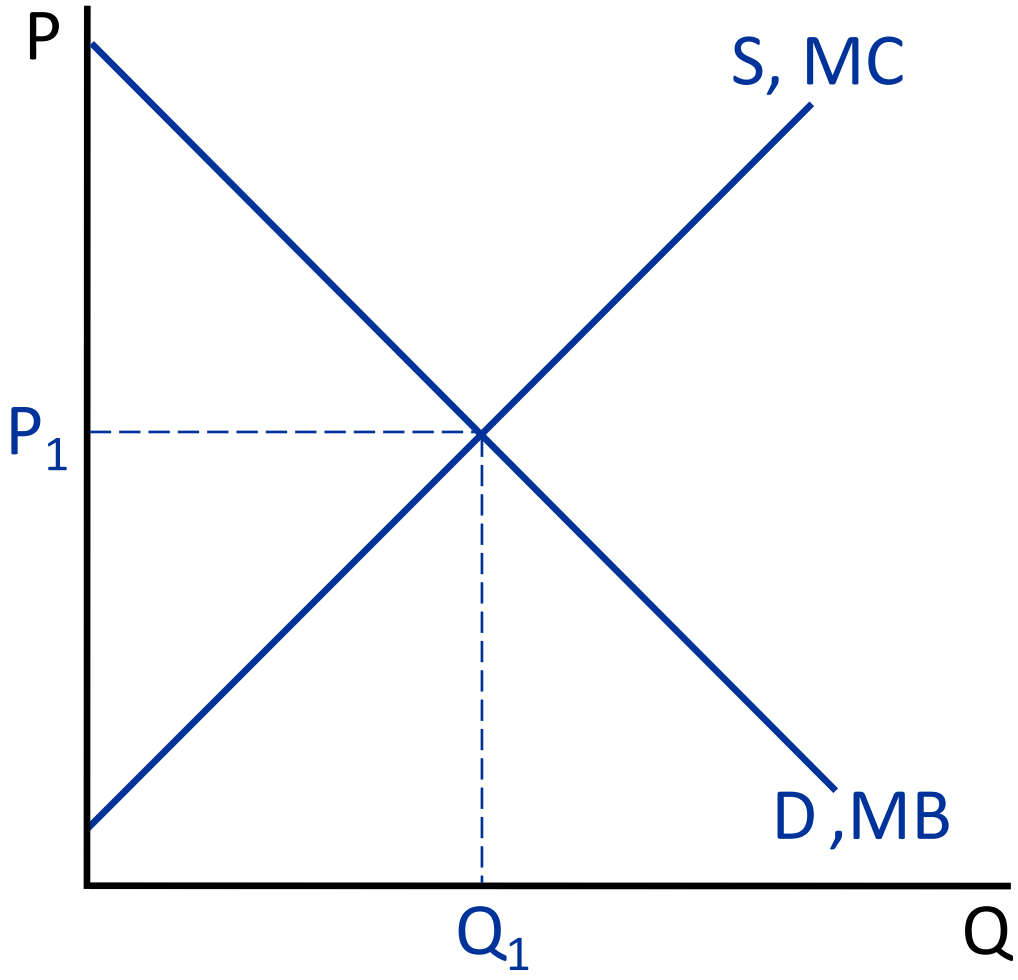
Producer Surplus



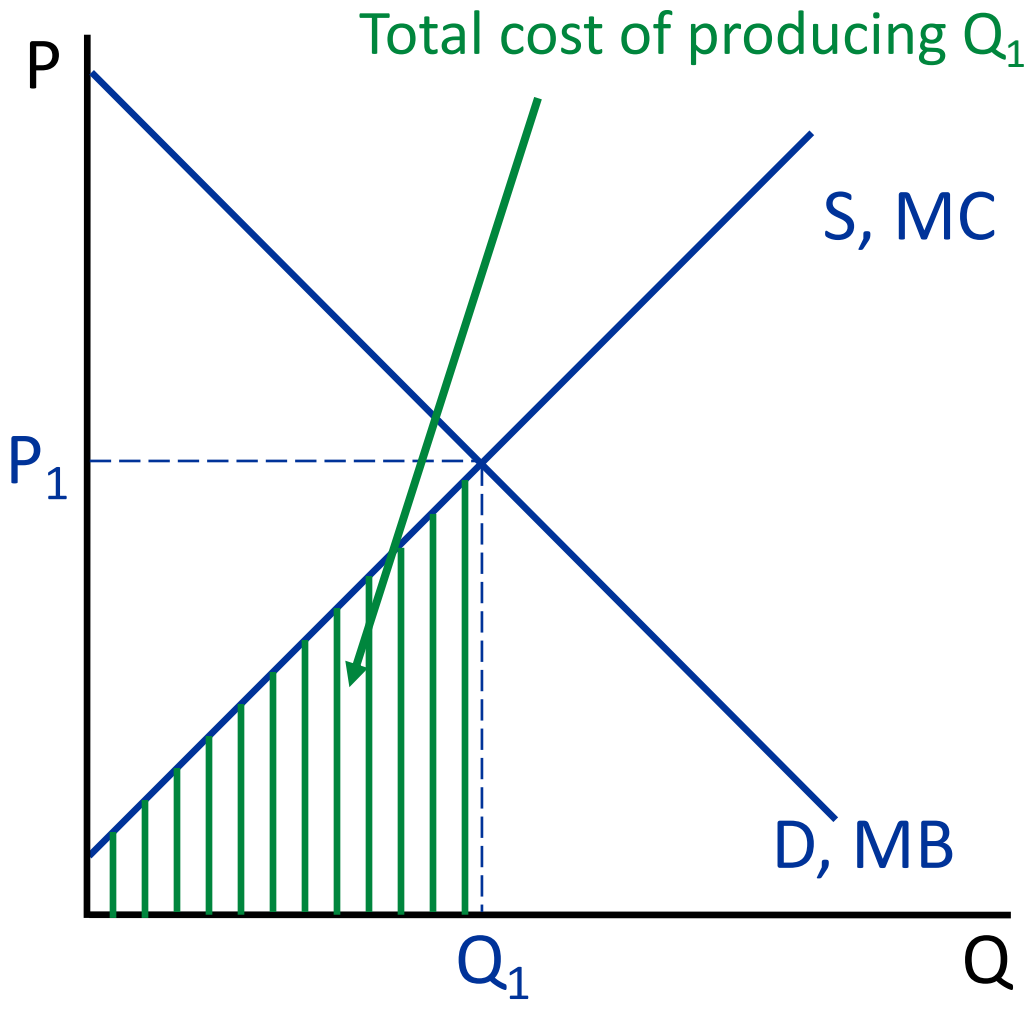
Producer Surplus



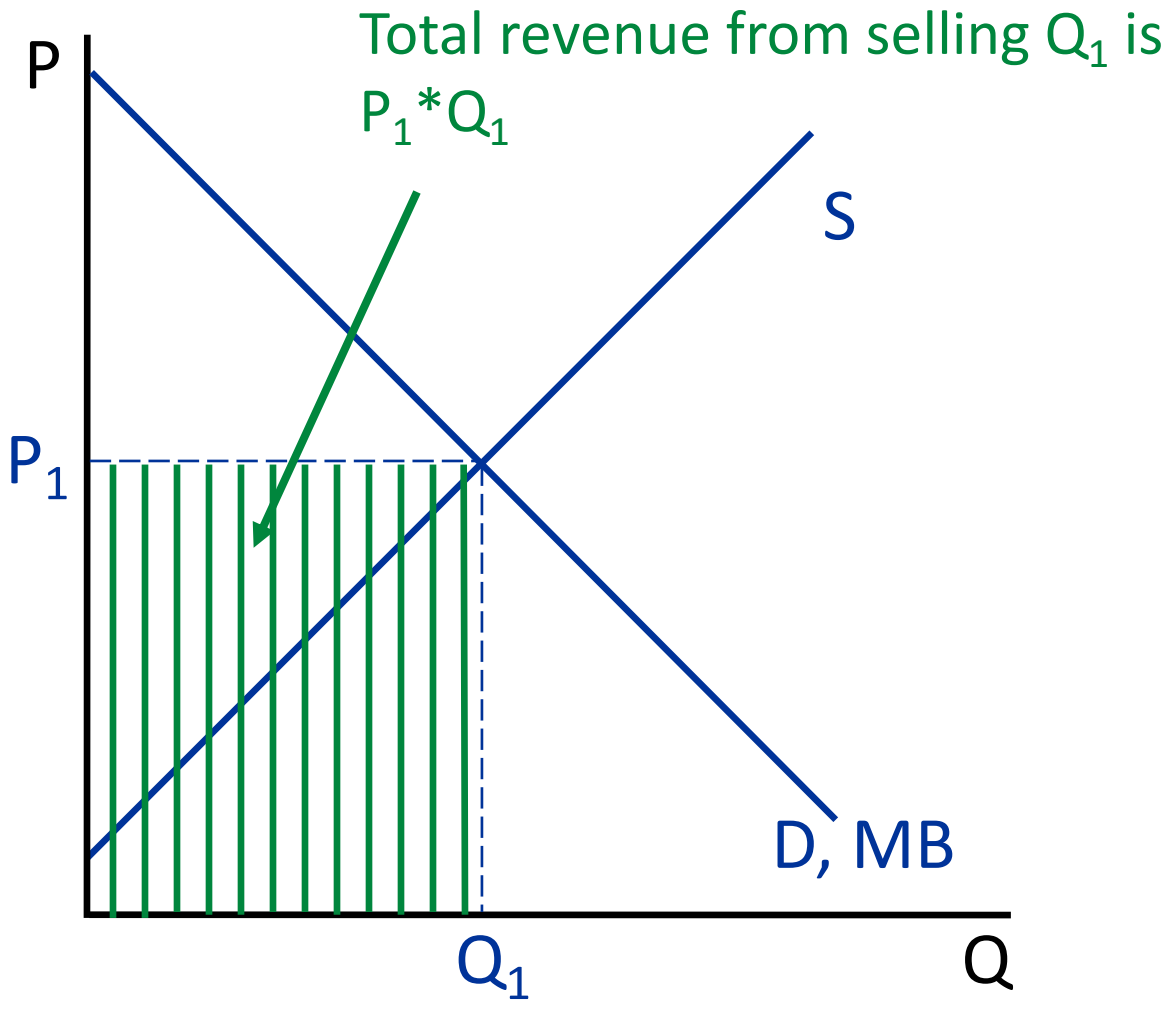
Producer Surplus



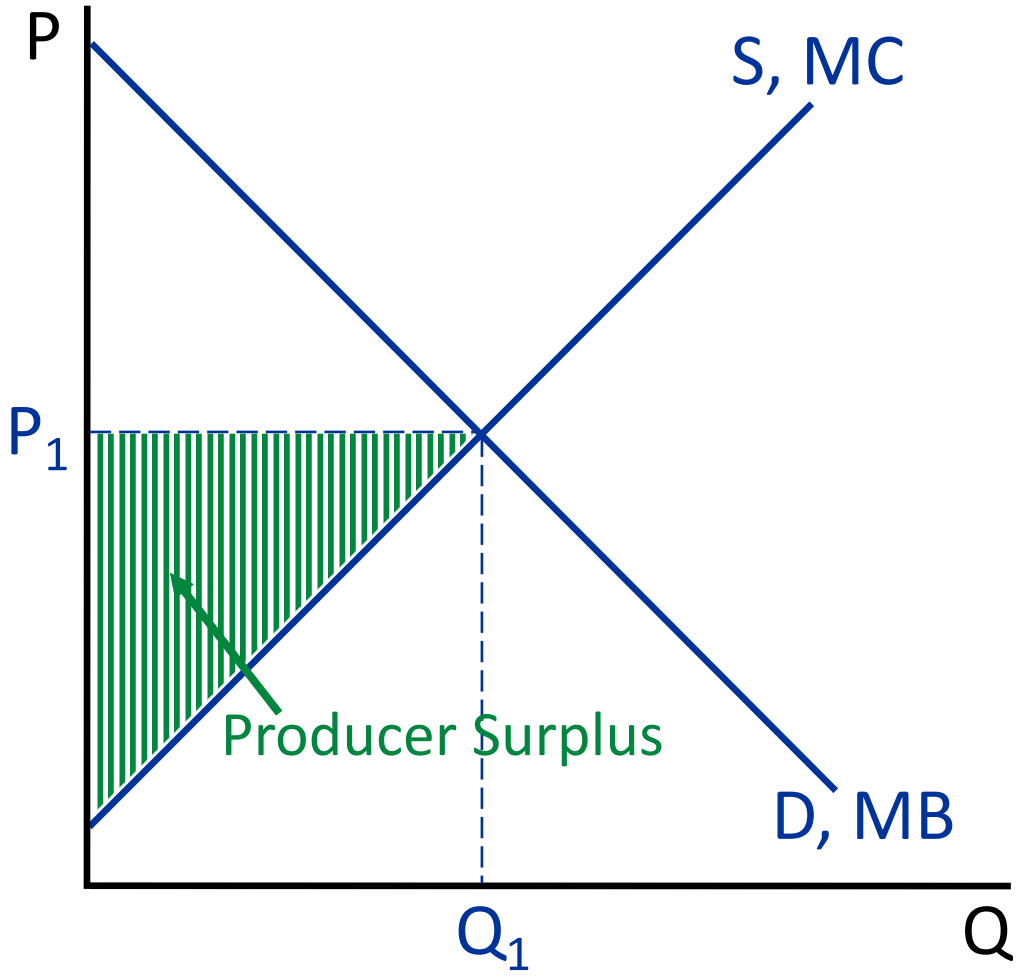
Producer Surplus



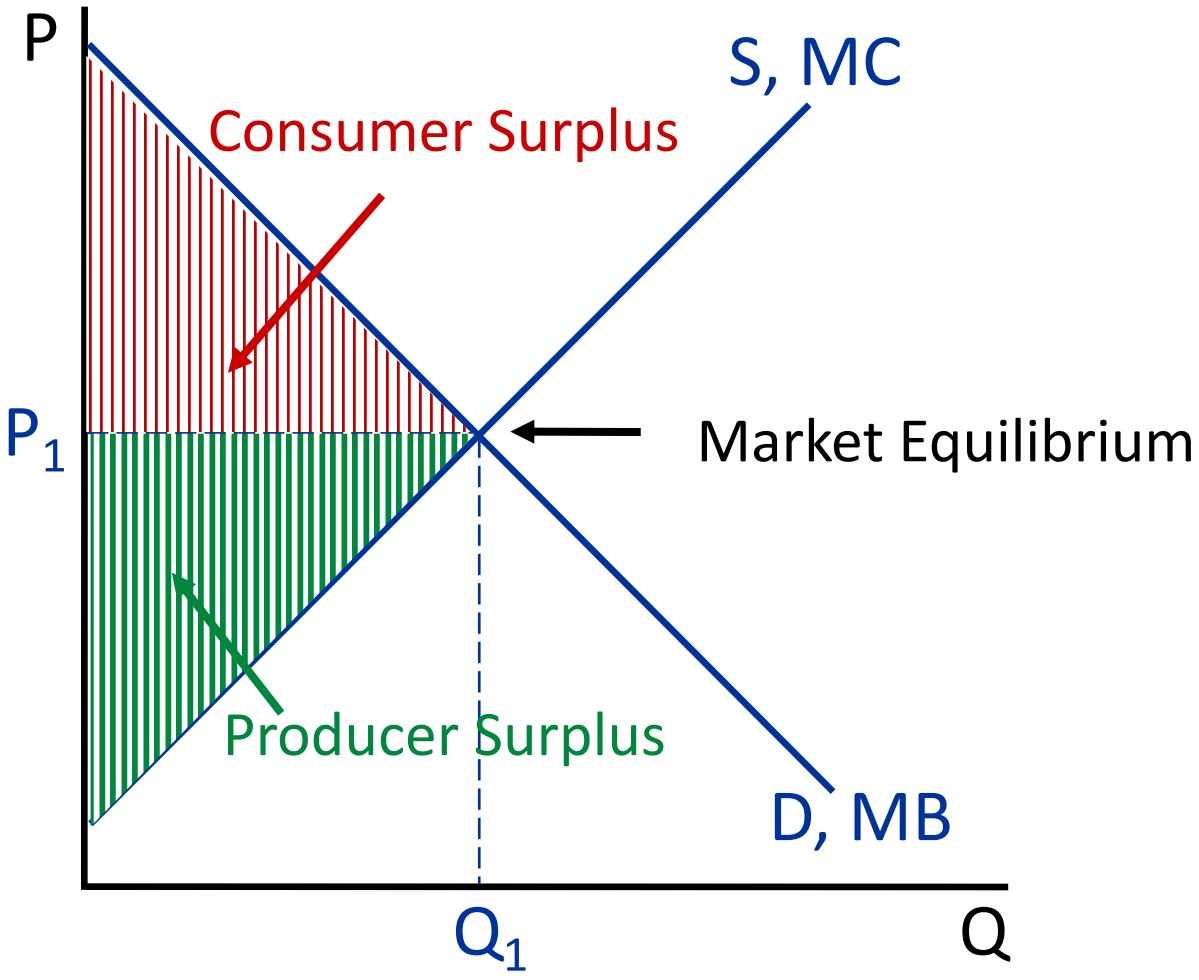
Producer Surplus



Producer Surplus



Consumer Surplus + Producer Surplus



Area between the MB and MC curves up to the level bought and sold.

Economic Surplus

Economic surplus represents the net gains to society from all trades that are made in a particular market, and it consists of two components: consumer and producer surplus.

- **Consumer surplus:** The benefit that consumers derive from consuming a good, above and beyond the price paid for the good = **area below demand curve and above market price**

- **Producer surplus:** The benefit producers derive from selling a good, above and beyond the cost of producing that good = **area above supply curve and below market price**

- **Total economic surplus:** Consumer surplus + producer surplus = **area above supply curve and below demand curve**

II. Allocative Efficiency

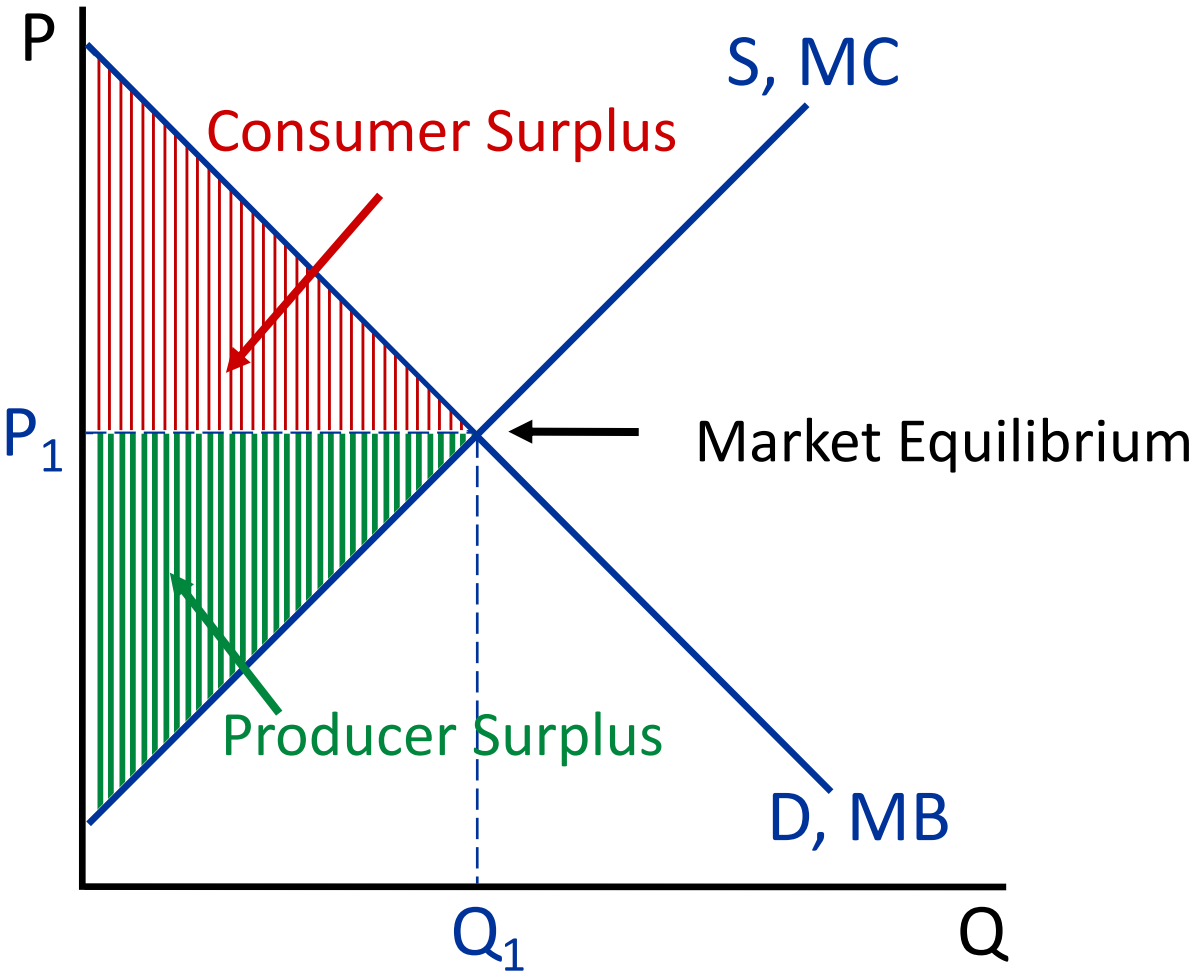
Allocative Efficiency (=Pareto Efficiency)

- Total surplus is as large as possible: impossible to find an alternative allocation that delivers more surplus to all parties
- It makes no judgment about which side of the market we care about: one dollar is one dollar
  - whether it goes to consumers or producers
  - whether it goes to poor/rich consumers
  - whether it goes to poor/rich producers

Conditions for Allocative Efficiency

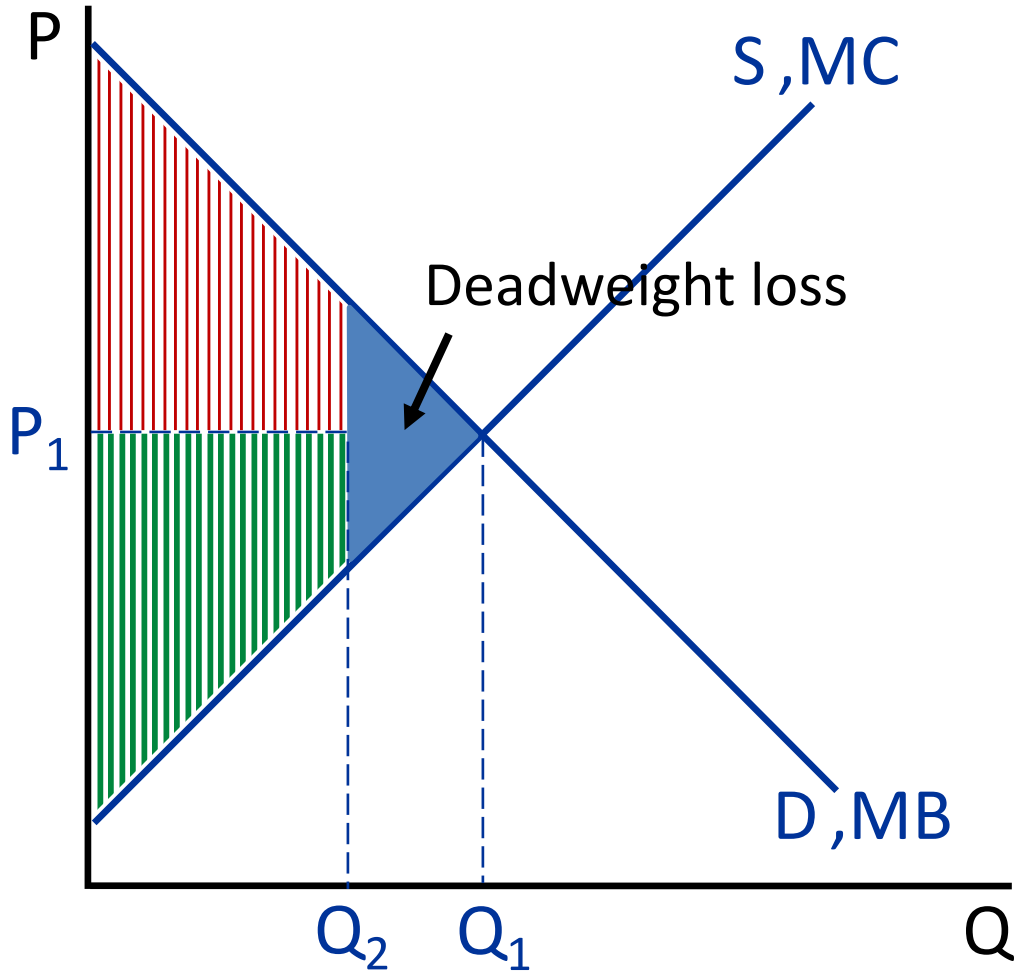
- The good is produced up to the point where MB = MC.
- The good is allocated to the consumers with the highest MB.
- The good is produced by the producers with the lowest MC.

Consumer Surplus + Producer Surplus



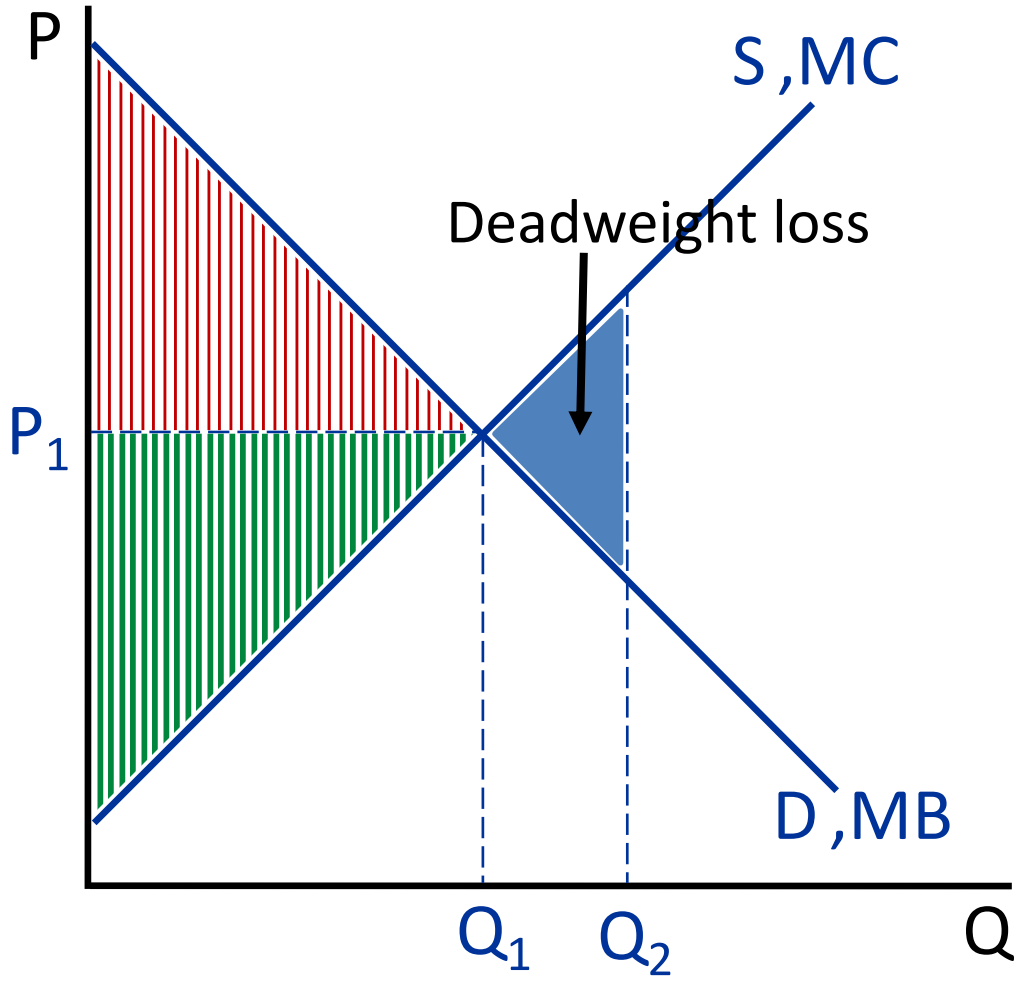
Area between the MB and MC curves up to the level bought and sold.

Deadweight Loss when Q is below market equilibrium Q_2



Q_2 does not realize all gains from trade: deadweight burden area = lost surplus relative to market equilibrium (P_1,Q_1)

Deadweight Loss also with production in excess of Q_2



Excessive Q_2 is also inefficient: production above Q_1 costs more to producers than it creates benefit to consumers

Deadweight loss (=deadweight burden)

- **Deadweight loss:** The reduction in economic surplus from denying trades for which benefits exceed costs when quantity differs from the efficient quantity
- **Implication:** Both too little or too much production relative to efficiency create deadweight loss
- **Key practical rule:** Deadweight loss triangle points toward the efficient allocation, and grows outward to current quantity

Competitive Equilibrium Maximizes Economic Surplus

- **First Theorem of Welfare Economics:** Competitive equilibrium where supply equals demand, maximizes total economic surplus (=efficiency)
- The simple efficiency result from the 1-good diagram can be generalized into the first welfare theorem (Arrow-Debreu, 1940s): **competitive markets are efficient**.

III. Equity and Efficiency

Equity Issues

- Willingness to pay (which underlies consumer surplus) depends a lot on income.
- Economists' measure of welfare doesn't take into account that consumers may enter the market with vastly different incomes.
- Economic surplus just counts dollars regardless of who gets them
- ⇒ 1st welfare theorem is **blind** to distributional aspects

Equity and Efficiency

- Allocative efficiency is still a worthy goal.
- Interfering with the price system to improve equity may reduce efficiency.
- In general, there are **equity vs. efficiency tradeoffs**: we have to sacrifice some economic surplus to get a more equitable outcome

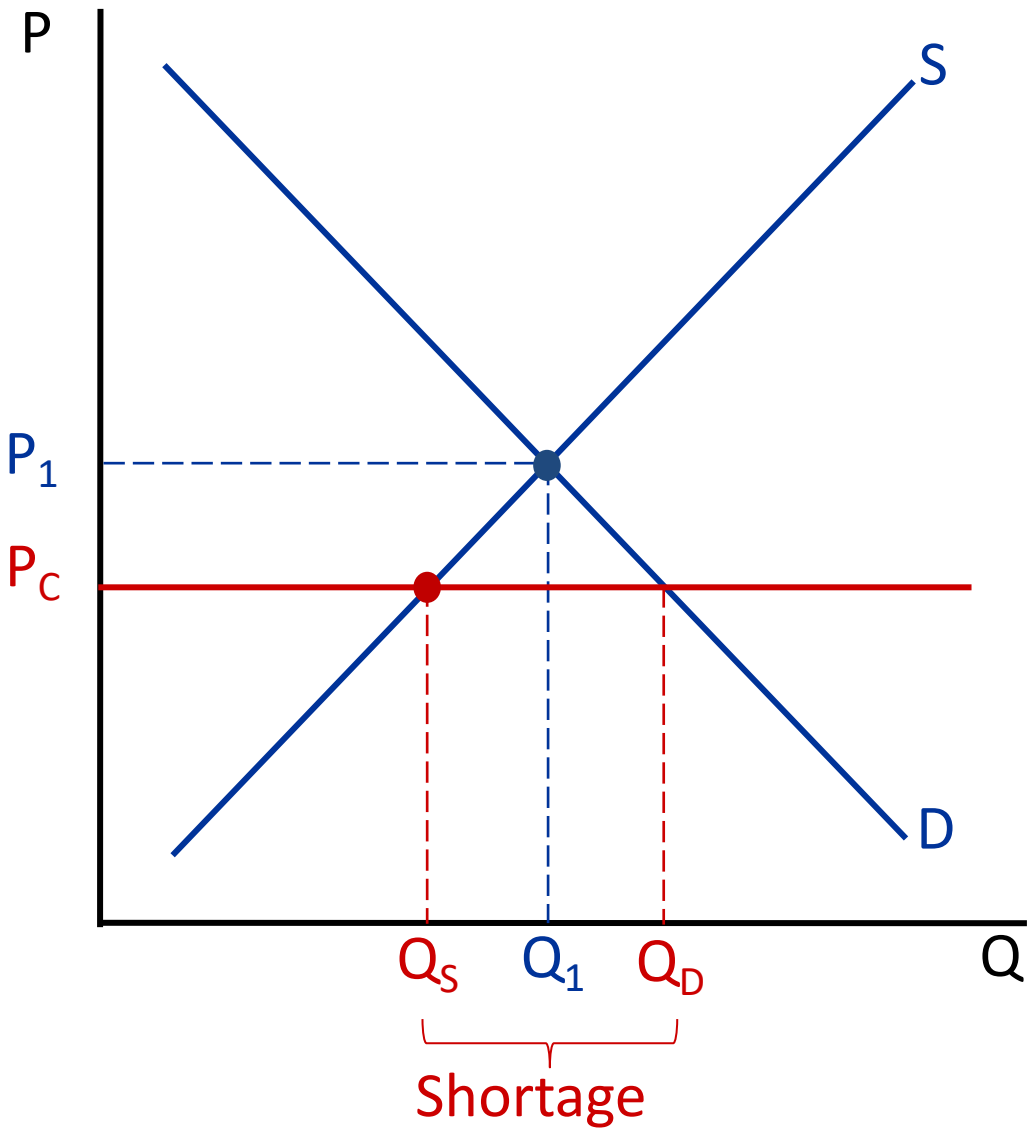
IV. Welfare Analysis of Price Controls

Price Control

- Government sets the price of a good; it is not allowed to go to its equilibrium level.
    - Price Ceiling: Maximum price; price is held below its equilibrium level.
    - Price Floor: Minimum price; price is held above its equilibrium level.

    Example: Up until 1998, city of Berkeley imposed rent price controls (since 1999, rent price control only after lease starts)

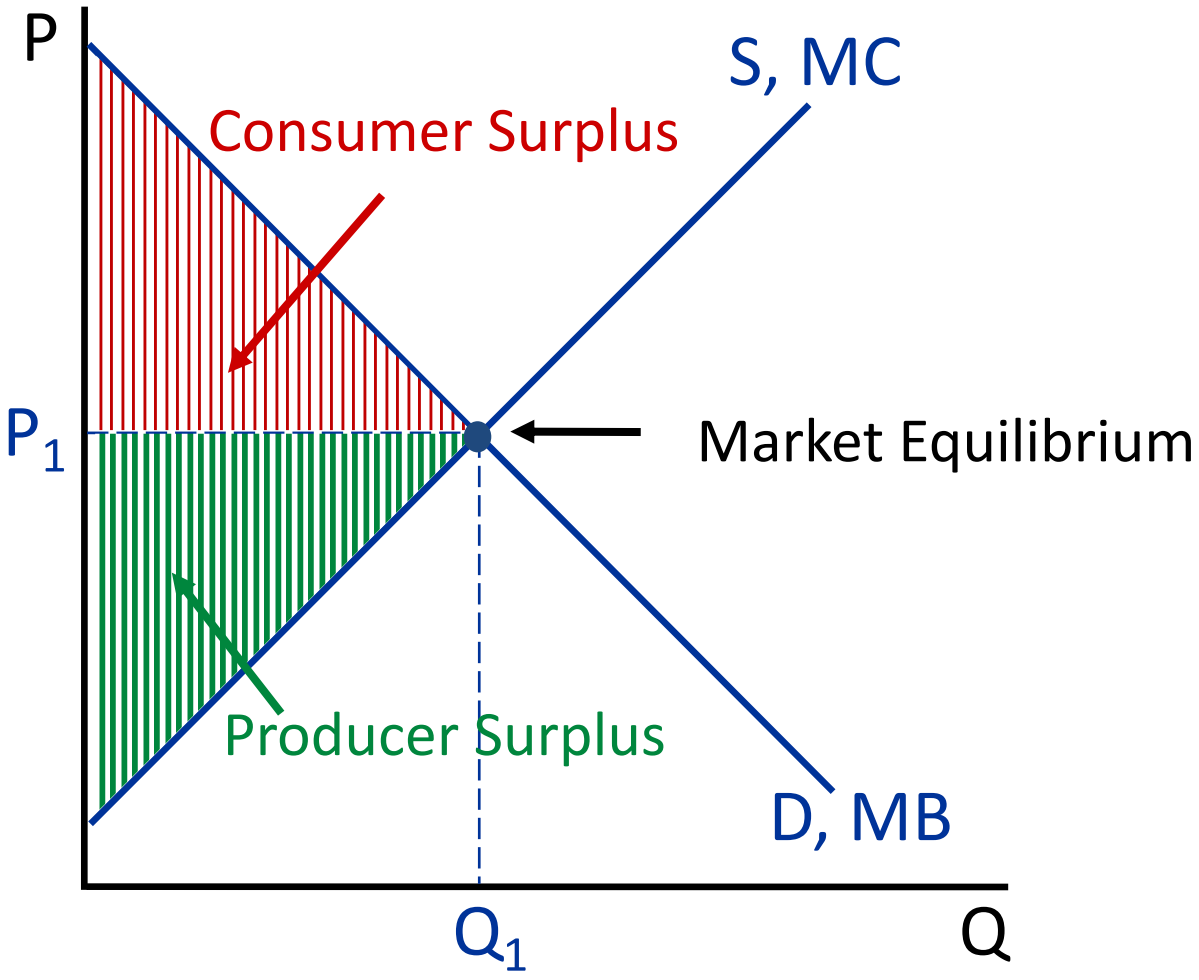
Effects of a Price Ceiling



Effects of a Price Ceiling

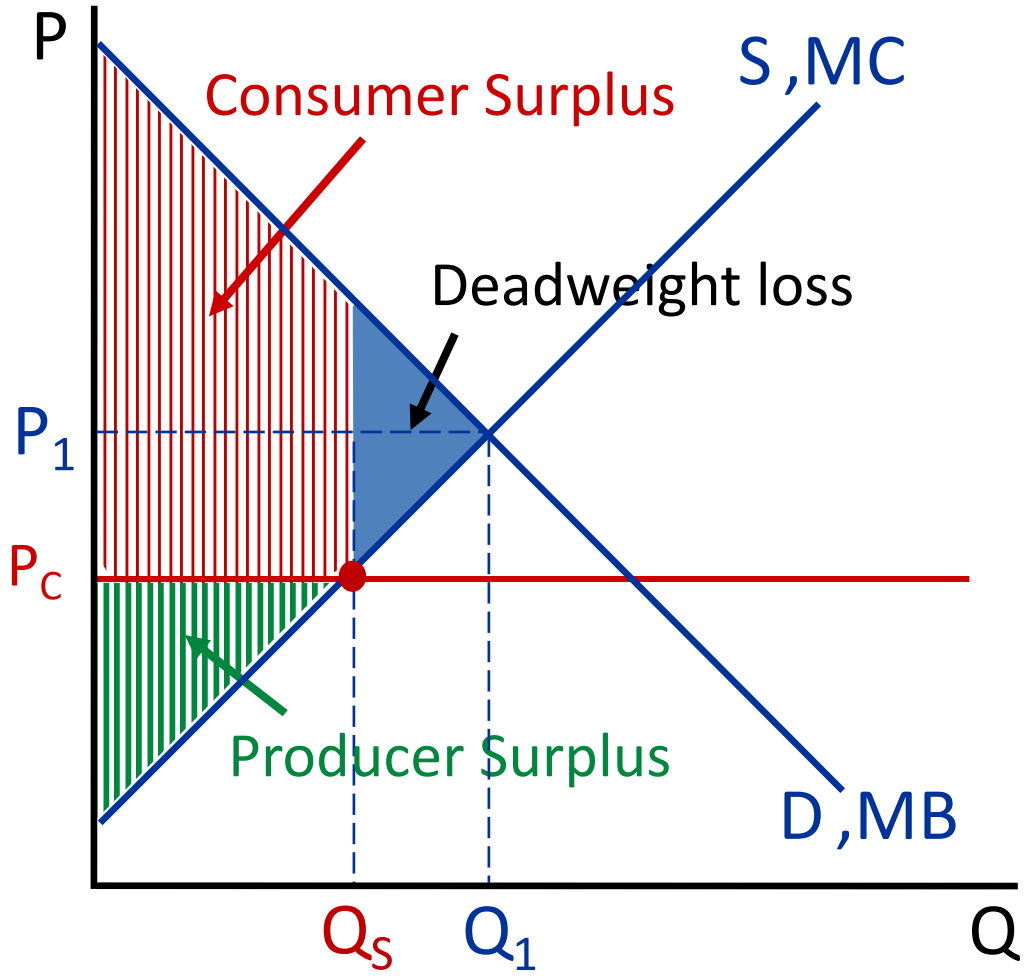
- Will lead to a shortage.
- Good will have to be allocated in some way other than by price:
  - Queuing (people line up to get served)
  - Government organized rationing (e.g. COVID vaccines in 2021): often used after disaster to ensure equal access to essentials
- Discourages the decrease in quantity demanded and increase in quantity supplied that automatically occur as the price rises.

Economic Surplus with no price ceiling



Market equilibrium maximizes the sum of consumer surplus and producer surplus

Economic Surplus with a price ceiling



Price ceiling P_C reduces total surplus but it increases consumer surplus (at the expense of producer surplus)

Poll

- Value question: Rent control reduces economic surplus but benefits poor renters at the expense of wealthy landlords: Suppose that each $1 lost by landlords translates into $.80 to renters and $.20 deadweight loss. What do you think ?

  A. That's good

  B. I can't judge if good or bad

  C. That's bad

Deadweight Loss and Misallocation

- Graphical analysis assumed that higher value consumers were served first
- When there is a shortage, we can't be certain that this assumption will be true:
- There could be **misallocation among consumers**: those who consume the good may not be the highest value consumers
- Example: low income elderly lady gets a rent control apartment but rich college student able to pay a lot more can't get one.

Rent Control Discussion

- In the model, rent control creates shortage and reduces economic surplus
- But rent control also benefits consumers (those who can find a rental unit)
- In real world: rent control also protects tenants from price fluctuations due to D and S shifts
- Alternative to rent control: subsidized public housing where government controls both price and quantity. Widely used across the world

Poll

- Value question: What is the best way for a city to organize housing for residents?

  A. Just let free markets of supply and demand work.

  B. Add rent control once a lease has started to insulate tenants from market price increases (current Berkeley model)

  C. Add rent control to protect both current and new tenants from market price increases (old Berkeley model)

  D. Add public housing to increase supply and stabilize prices.

Even without price controls, shortages and queuing can happen in real world markets due to price rigidity

- Some goods are in higher demand at some times: e.g., restaurants on a Saturday night; parking on streets during football games; etc.

- Not practical or upsetting to customers if sellers adjust prices in real time (e.g. Uber surge pricing backlash).

- This creates shortages resolved through "inefficient" queuing [rich person cannot bribe his way to the front]

- Labor market also has queuing: **In recessions**, unemployed are queuing for jobs and can't bid wages down instantaneously. **In booms**, employers struggle to find workers, and can't bid up wages for new hires only