Taxation and Government Intervention

Collecting more taxes than is absolutely necessary is legalized robbery.

— *Calvin Coolidge*

Consumer Surplus

- **Consumer surplus** is the value the consumer gets from buying a product, less its price (paying less than you are willing to pay)
  - It is the area below the demand curve and above the price
  - **Example: I was willing to pay $1.75 for a Gatorade but I only paid $1.50**

Draw the Graph: Consumer Surplus


P

S

CS

P₁

Q₁

D

Q
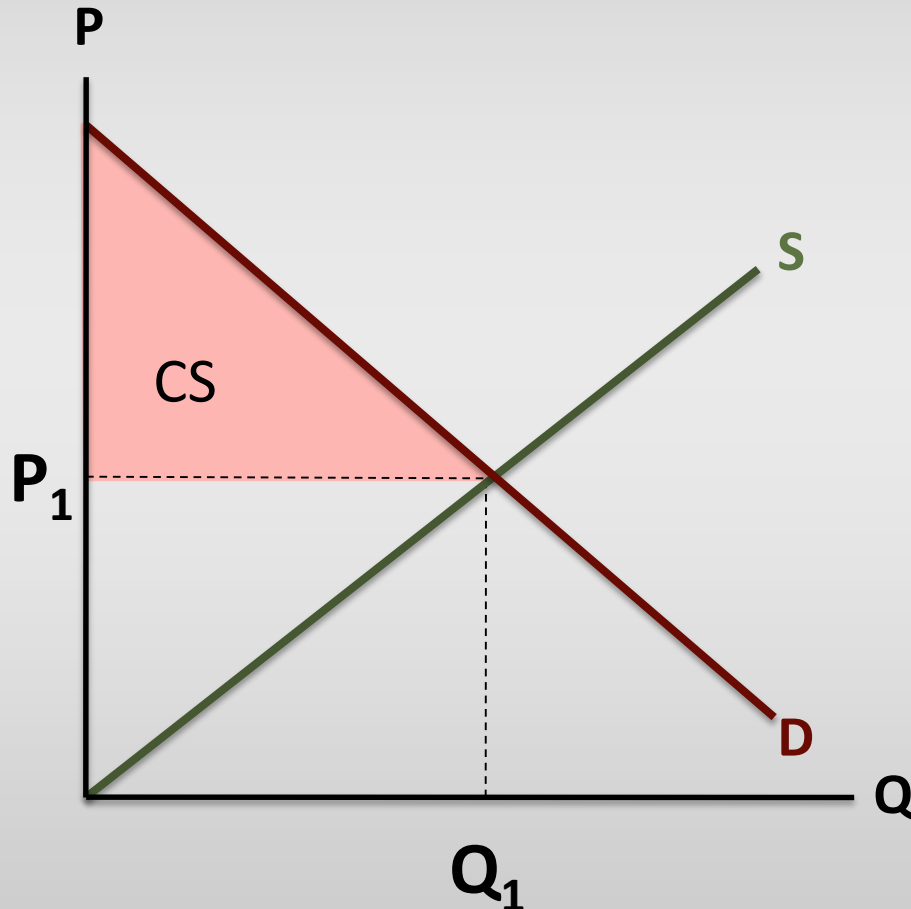
Consumer surplus=area below the demand curve and above price

Producer Surplus

- **Producer surplus** is the value the producer sells a product for less the cost of producing it (receiving more than the price you are willing to sell the good for)
  - It is the area above the supply curve but below the price the producer receives
  - **Example: The producer was willing to sell blue t-shirts for $10 but people were willing to pay $12 for them**
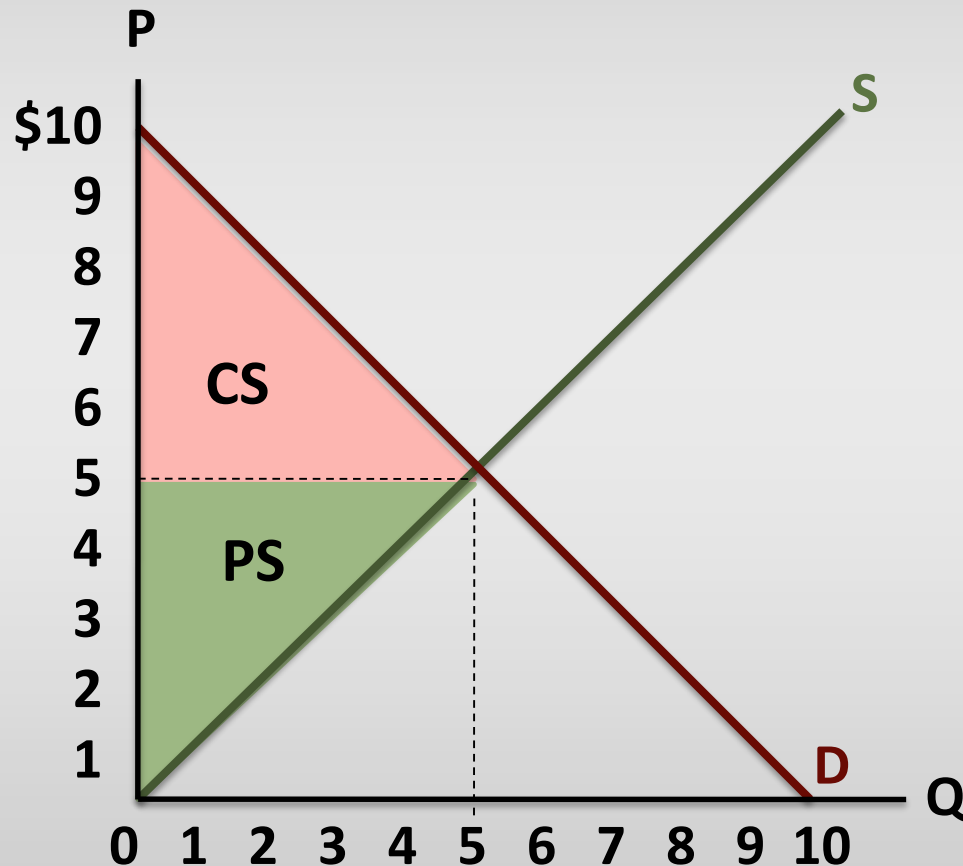
Draw the Graph: Producer Surplus

P

S
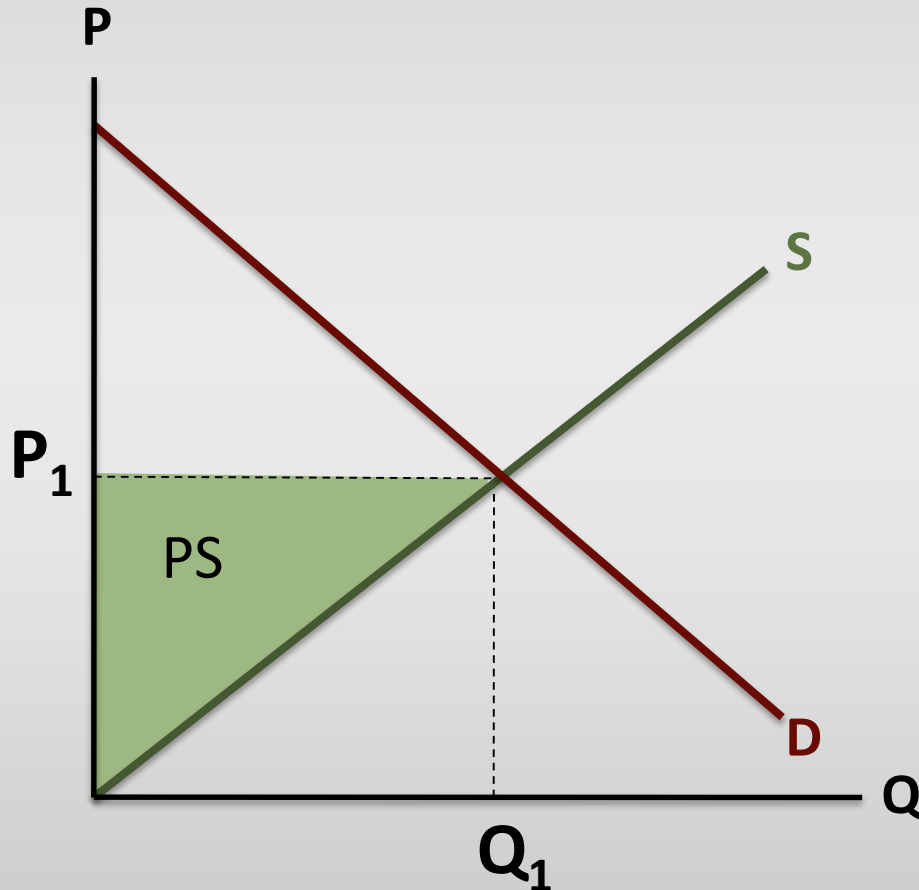
Producer surplus =area above the supply curve and below price

P₁

PS

D

Q₁

Q

Calculating CS and PS

- To calculate the CS and PS use the formula for the **area of a triangle**
  - ½(base x height)

Producer and Consumer Surplus

**Consumer surplus =
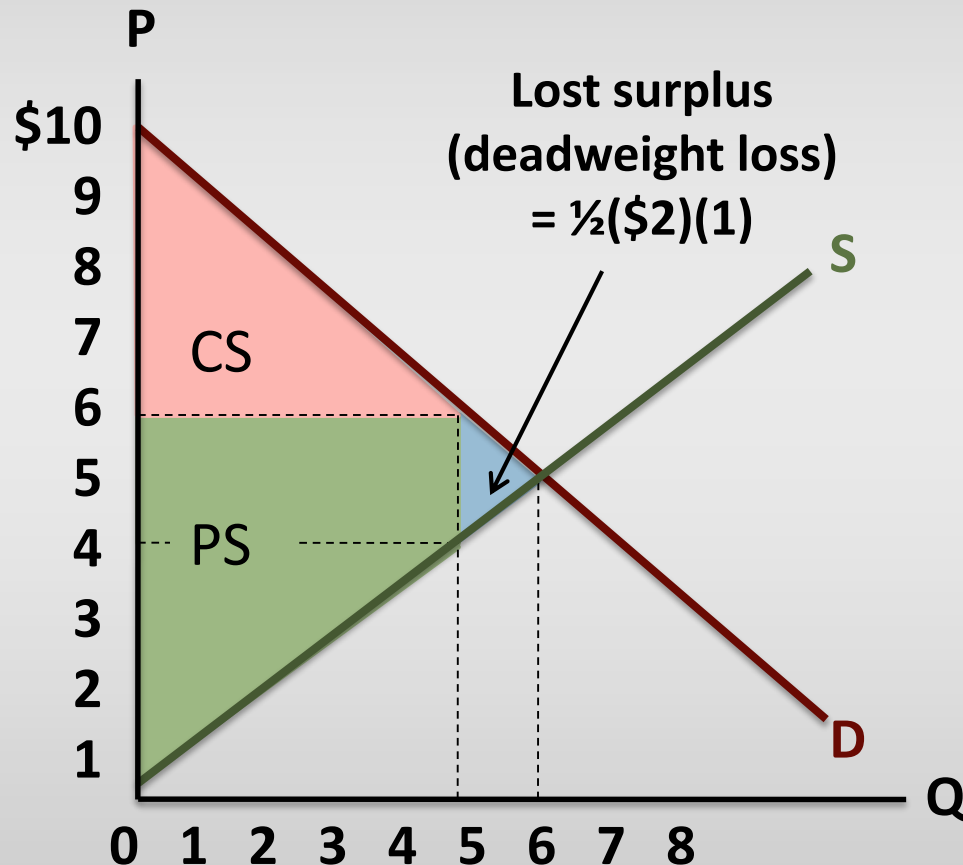area of red triangle =
½(5)($5) = $12.50**

**Producer surplus = area of
green triangle = ½(5)($5) =
$12.50**

**The combination of
producer and consumer
surplus is maximized at
market equilibrium**

Producer and Consumer Surplus

Suppose P increases to $6

Consumer surplus decreases = area of red triangle = ½(5)($4) = $10

Producer surplus increases = areas of green triangle and rectangle = ½(5)($4)+(5)(2)= $20

The combination of producer and consumer surplus decreases when price is greater than equilibrium price

The Burden of Taxation

- **Taxes** on suppliers **decrease** supply

- **Taxes on consumers decrease demand**

  - **In the both cases, taxes reduce the amount of trade**

- The **burden of taxation** is a tax paid by the supplier

  - It shifts the supply curve to the left by the amount of the tax

Colander, Economics

The Burden of Taxation

The costs of taxation include:

- **Direct cost of the tax paid to the government by consumers and producers**
- The **deadweight loss** the loss of consumer and producer surplus from a tax (that is not gained by the government)
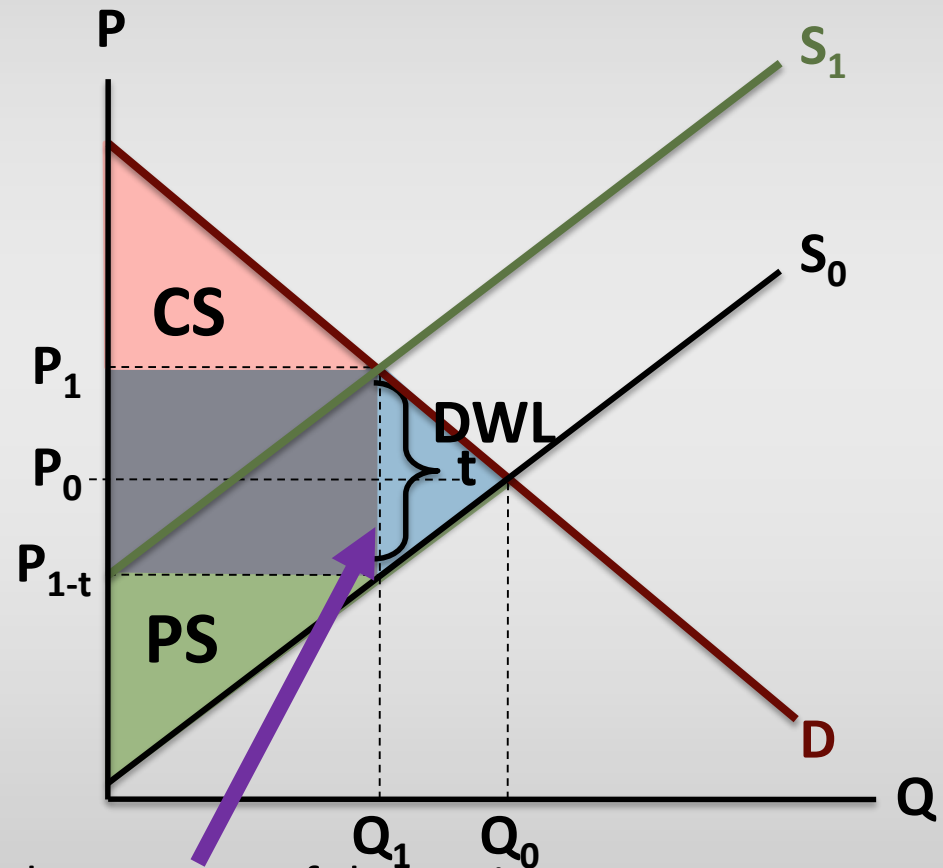 - This is shown graphically by the **welfare loss triangle**

The Burden of Taxation

A tax paid by the supplier shifts the supply curve up by the amount of the tax (t)

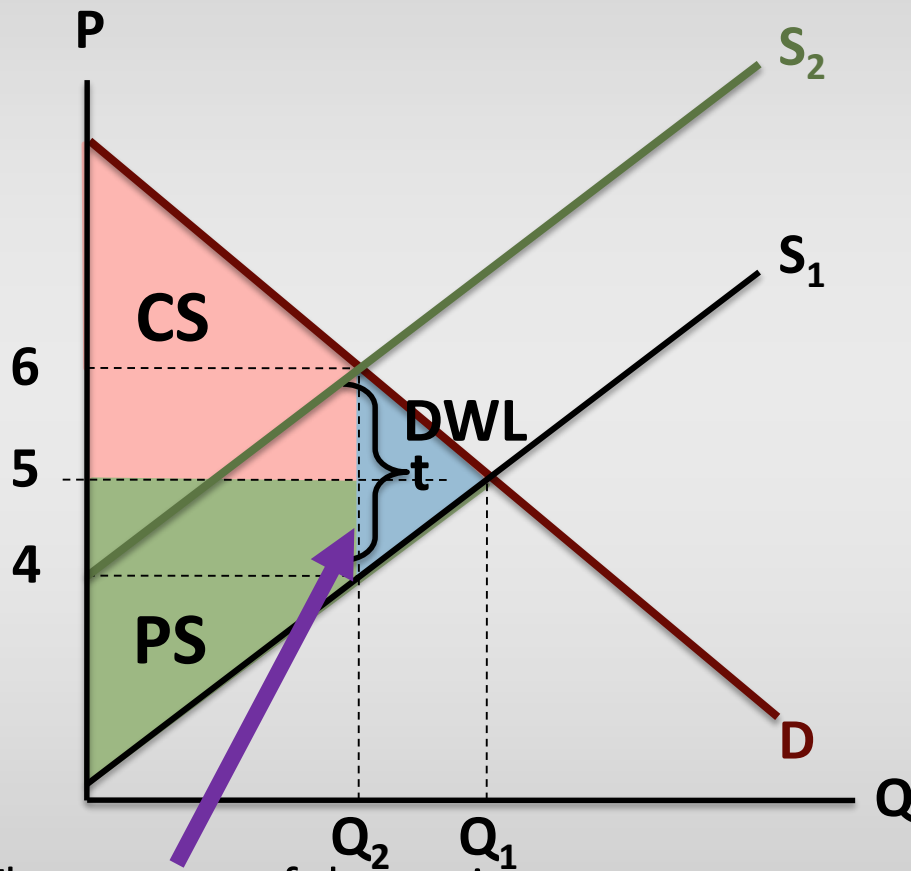Both producer and consumer surplus decrease

Positive government revenue exists

Deadweight loss exists

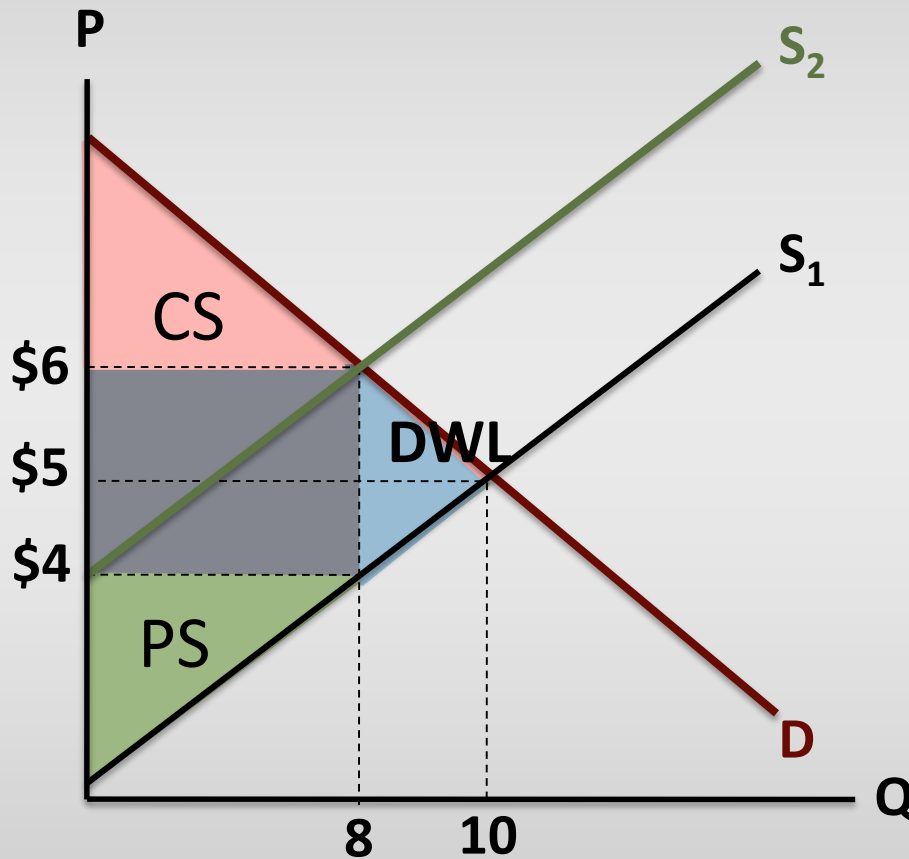The amount of the tax is the distance between the supply curves

Draw the Graph: A $2 Tax

P

S₂

S₁

CS

6

DWL

5   }t

4

PS

D

Q

Q₂   Q₁

The amount of the tax is
the distance between
the supply curves

- The distance between the supply curves is $2.
- The new equilibrium price is $6.
- The blue triangle represents DWL as a result of the tax.
- Both CS and PS decrease as a result of the tax (label them on your graph)

Revenue Box

- The revenue box is created by the distance between the supply curves and by drawing a line from each point to the price axis
- This results in a smaller areas of CS and PS
- Using the graph, what is the amount of tax revenue?
  - The amount of tax revenue is
    = 2(8)
    =$16

What price do buyers pay and sellers keep as a result of a $2 tax?
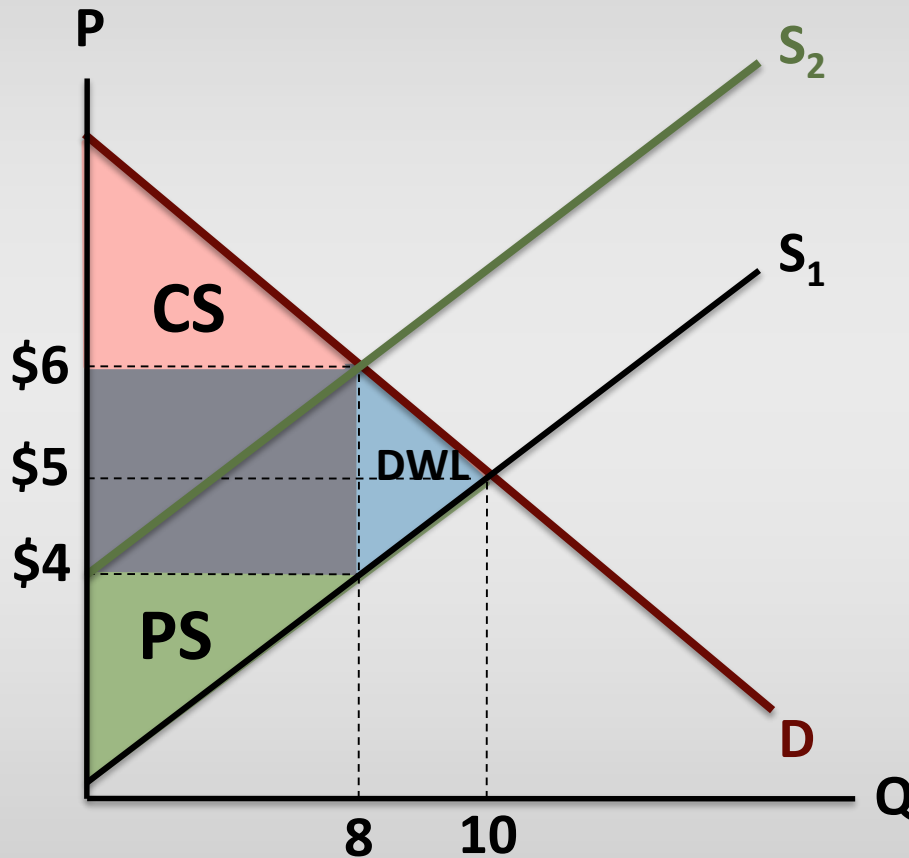
- What price do **buyers** pay?
- They pay **$6** (were paying $5 before the tax; an increase of $1)
- What is the price **sellers** keep?
- **$4** (the new price is $6 but they have to pay the $2 tax)

Who Bears the Burden of Taxation?

- **The tax burden (or tax incidence):**

  - **The person who physically pays the tax is not necessarily the person who bears the burden of the tax**

Who Bears the Burden of Taxation?

- The more *inelastic* one's relative demand and supply, the *larger* the tax burden one will bear
  - If **demand** is more **inelastic** than **supply**, **consumers** will **pay the higher share**
  - If **supply** is more **inelastic** than **demand**, **suppliers** will **pay the higher share**

What Goods Should Be Taxed?

Goal of Government	Most effective when
Raise revenue, limit deadweight loss	Demand or supply is *inelastic*
Change behavior	Demand or supply is *elastic*

Elasticity	Who bears the burden?
Demand *inelastic* and supply *elastic*	Consumers
Supply *inelastic* and demand *elastic*	Producers
Both supply and demand *elastic*	Shared, but the group whose S or D is more *inelastic* pays more

The Burden of Taxation

How to calculate the fraction of the tax borne by consumers and producers:

$$\text{Fraction of tax borne by demander} = \frac{E_S}{E_D + E_S}$$

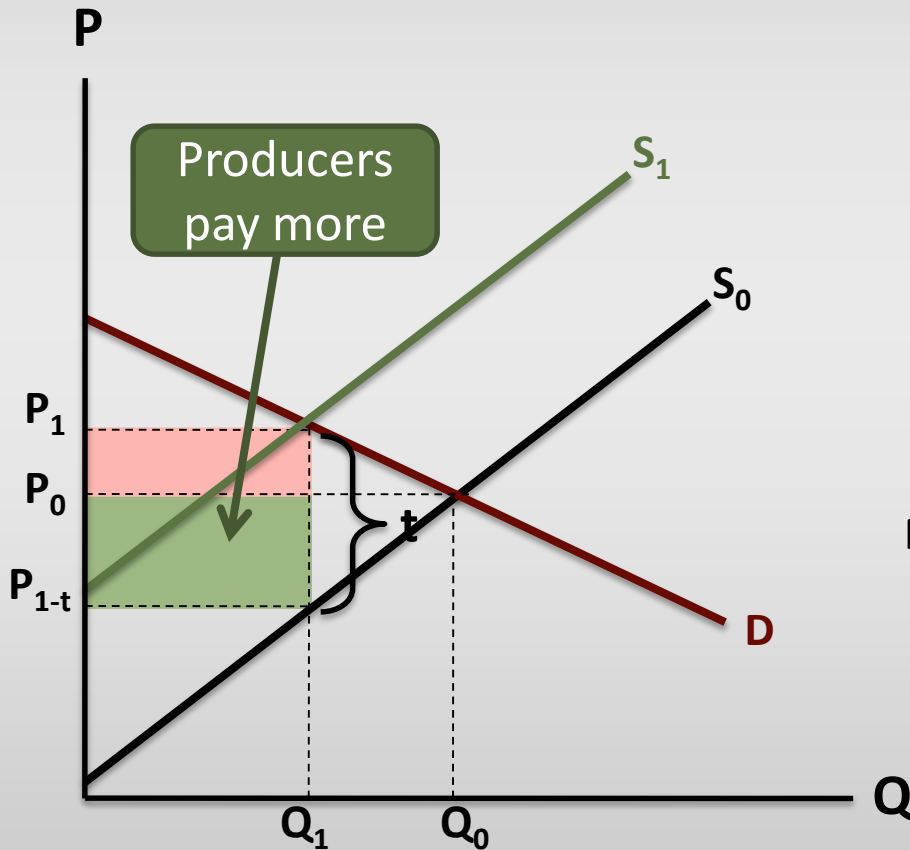$$\text{Fraction of tax borne by supplier} = \frac{E_D}{E_D + E_S}$$

Example

- Price elasticity of supply is 4

- Price elasticity of demand is 1

- **Fraction of tax borne by demander** $= \dfrac{E_S}{E_D + E_S}$
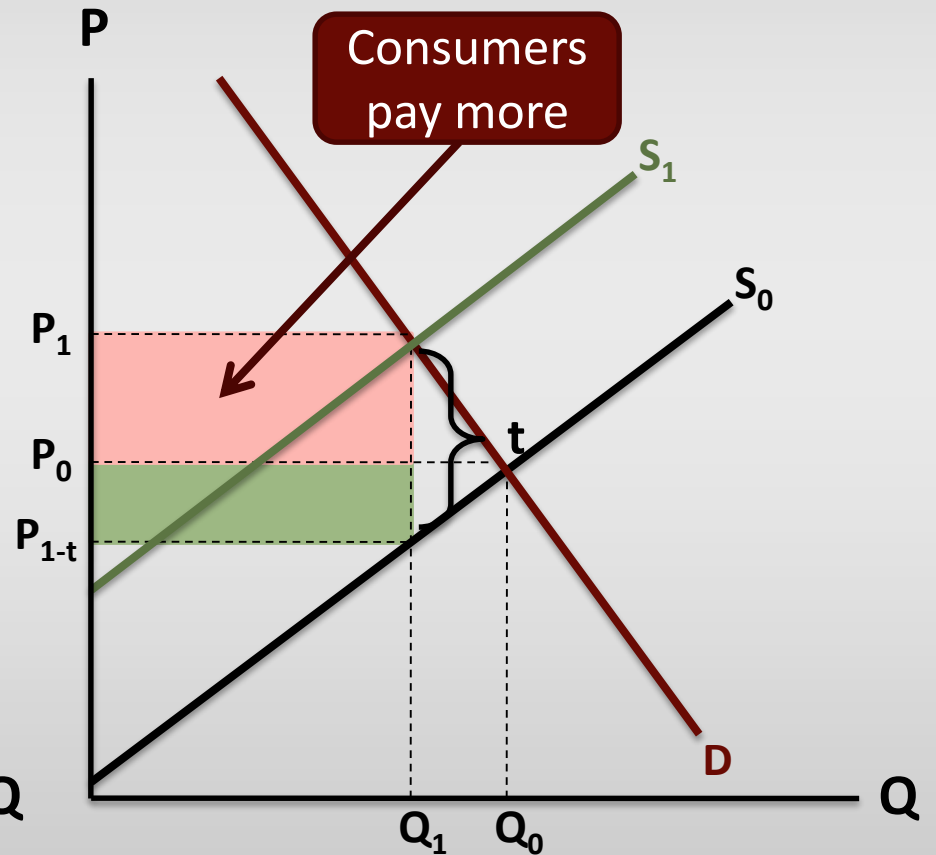 - **4/1+4= 4/5**

- **Fraction of tax borne by supplier** $= \dfrac{E_D}{E_D + E_S}$
  - **1/1+4= 1/5**

The Burden of Taxation
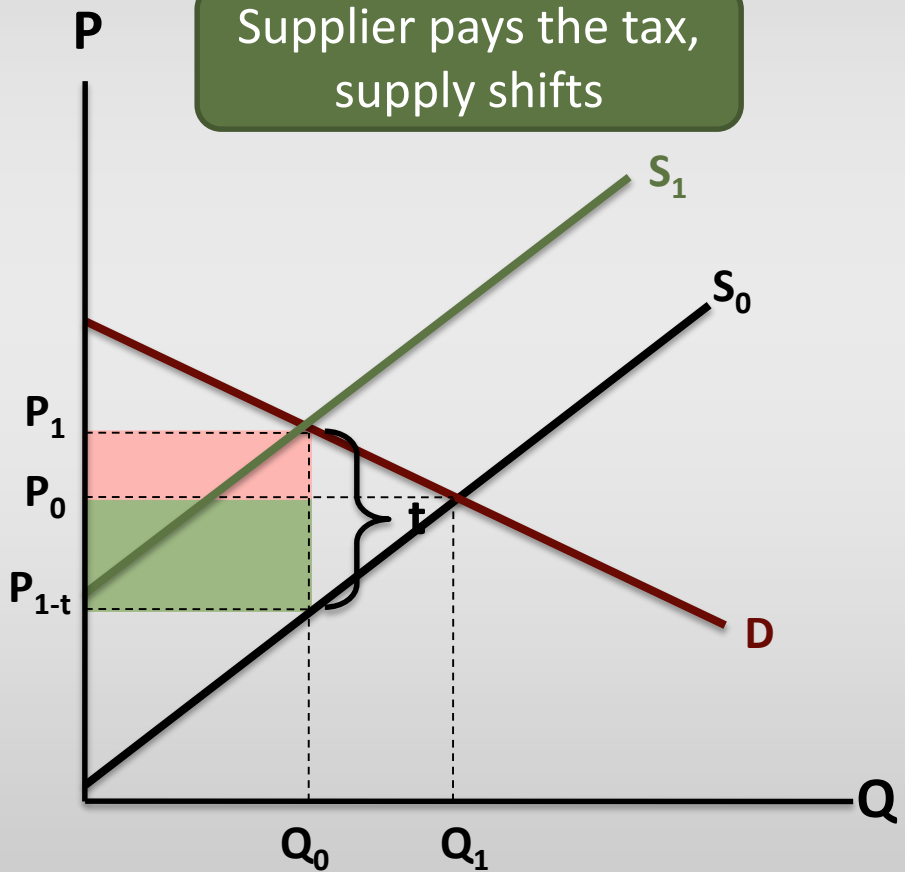
Demand is relatively elastic
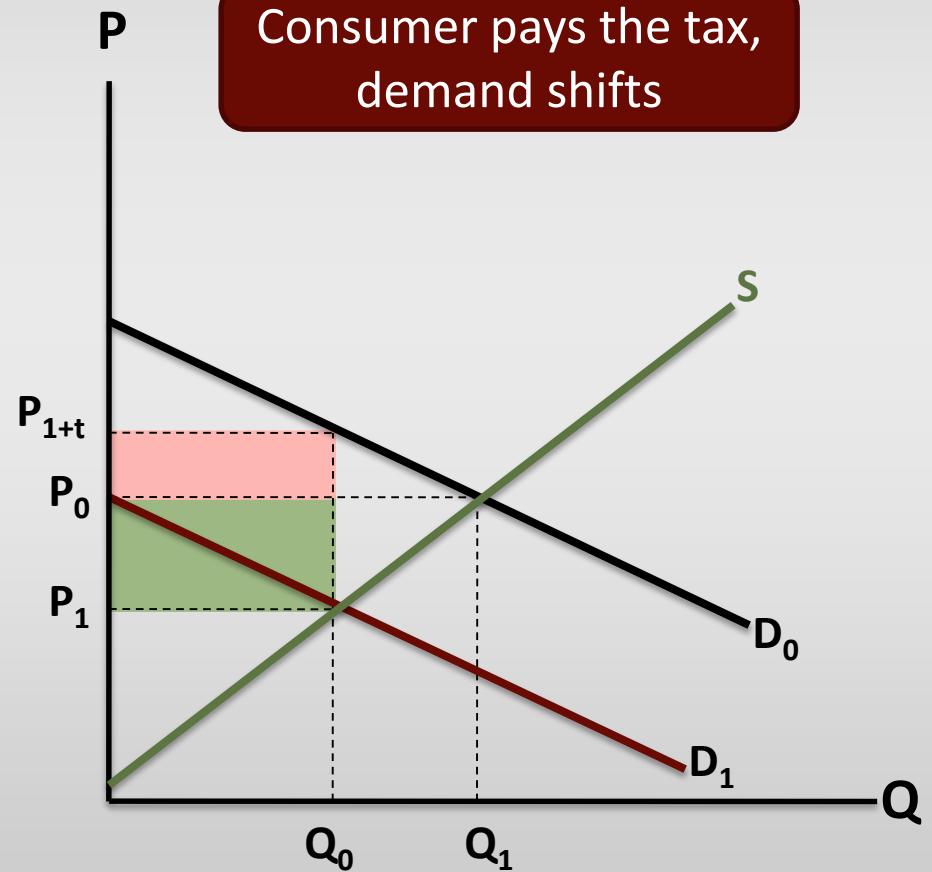

Demand is relatively inelastic

The Burden of Taxation

The tax burden is *independent* of who pays the tax

Tax Incidence and Current Policy Debates: Social Security Taxes

- **Both employer and employee contribute the same percentage of before-tax wages to the Social Security fund**
- **Although the employer and employee contribute the same percentage, they do not share the burden equally**
- **On average, labor supply tends to be less elastic than labor demand, so the Social Security tax burden is primarily on employees**

Tax Incidence and Current Policy Debates: Sales Taxes

- **Sales taxes are paid by retailers on the basis of their sales revenue**
- **Since sales taxes are broadly defined to include most goods and services, consumers find it hard to substitute to avoid the tax**
- **Demand is inelastic so consumers bear the greater burden of the tax**
- **As consumers increase purchases on the Internet where sales are not taxed, retail stores will bear a greater burden of the sales tax**
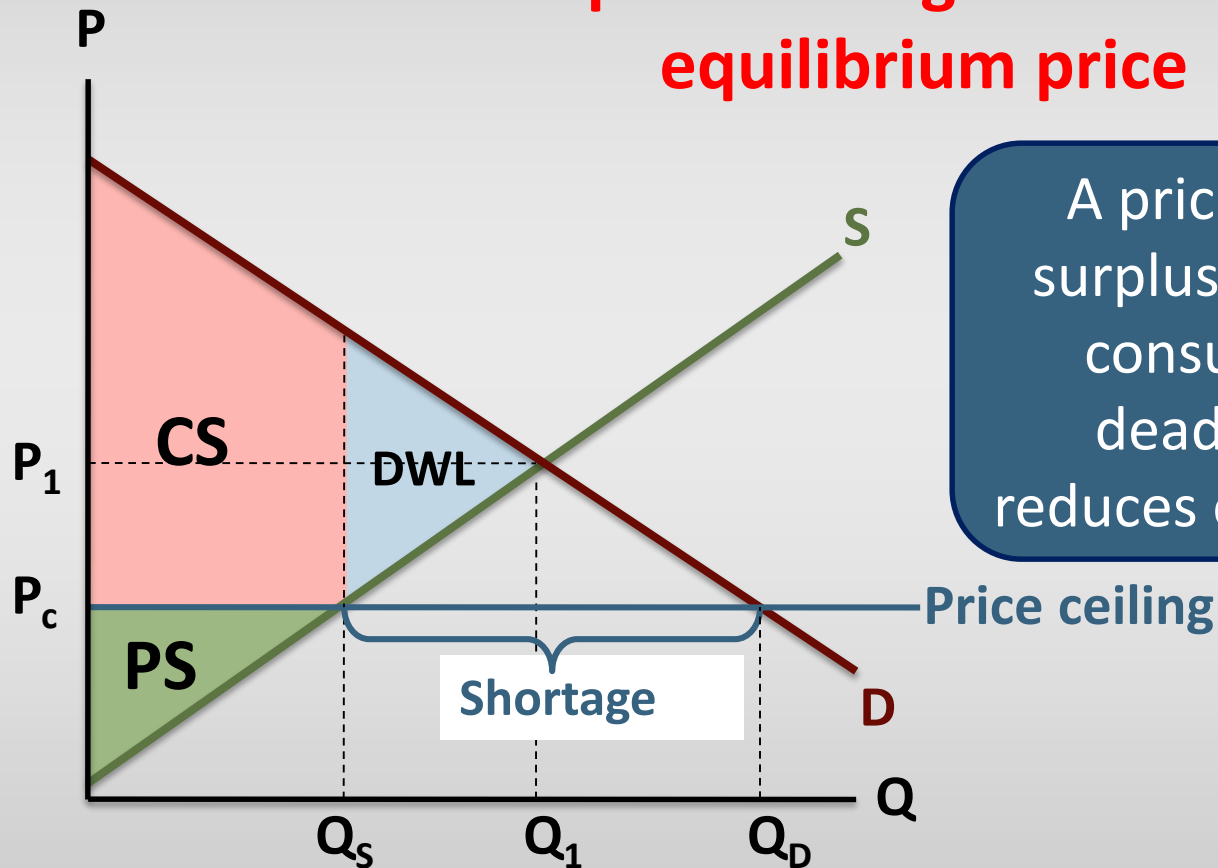
Government Intervention as Implicit Taxation

- **Government intervention in the form of price controls can be viewed as a combination tax and subsidy**

Government Intervention as Implicit Taxation

- **An effective price ceiling is a government-set price below the market equilibrium price**

- A **price ceiling** acts as an **implicit tax on producers** and an **implicit subsidy to consumers** that causes a welfare loss identical to the loss from taxation

  - A **price ceiling** redistributes surplus from producers to consumers

Application: The Effect of a Price Ceiling

An effective price ceiling is set below market equilibrium price
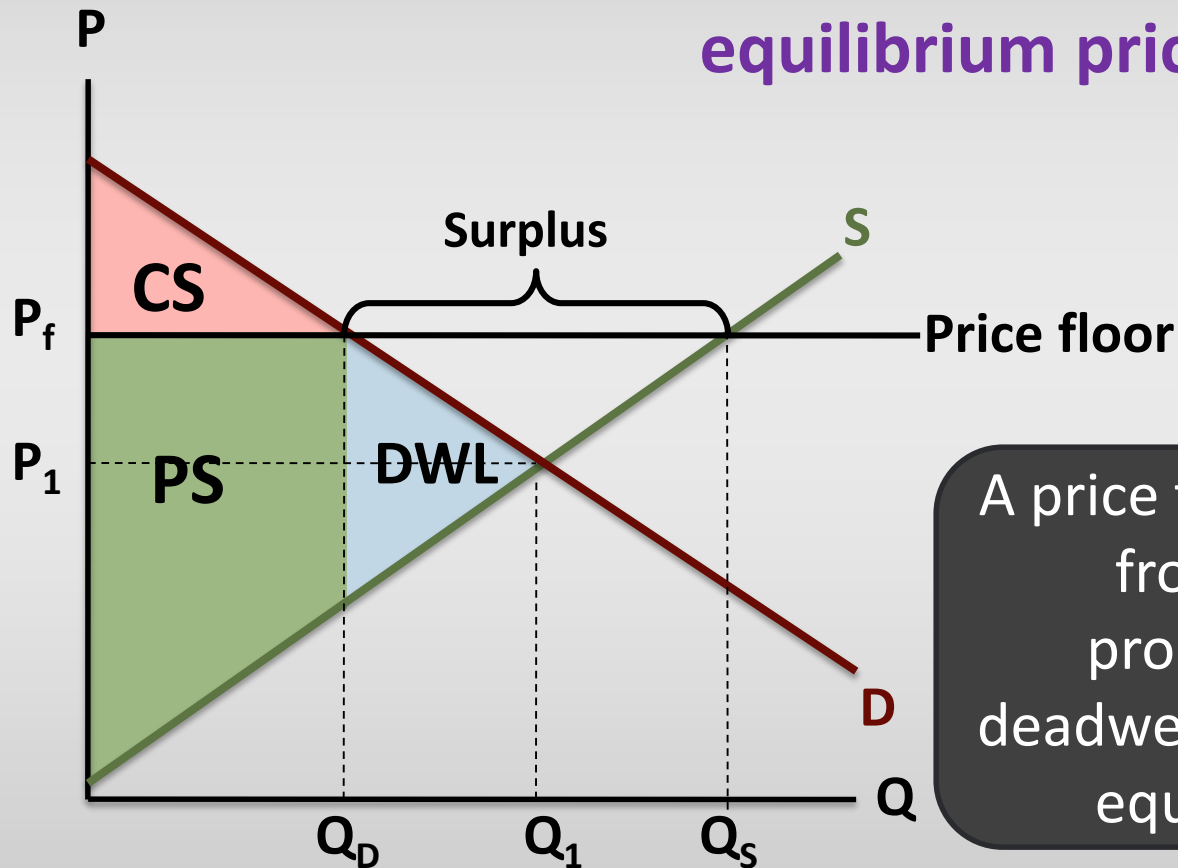

A price ceiling transfers surplus from producers to consumers, generates deadweight loss, and reduces equilibrium quantity

Government Intervention as Implicit Taxation

- **An effective price floor is a government set price above the market equilibrium**

  - It acts as a **tax on consumers** and a **subsidy for producers** that transfers consumer surplus to producers

Application: The Effect of a Price Floor

An effective price floor is set above market equilibrium price

P

S

Surplus

CS

P_f Price floor

P_1 DWL

PS

D

Q

Q_D Q_1 Q_S

A price floor transfers surplus from consumers to producers, generates deadweight loss, and reduces equilibrium quantity

The Difference between Taxes and Price Controls

- **Price ceilings create shortages** and **taxes do not**
- Taxes leave people **free** to **choose** how much to supply and consume as long as they pay the tax
- Shortages may also create black markets

Inelastic Demand and Incentives to Restrict Supply

- **When demand is inelastic, increases in productivity that increase supply result in lower revenue for the suppliers**
- Suppliers have an incentive to restrict supply when demand is **inelastic**, because, by doing so, they will increase their revenues

# Inelastic Demand and Incentives to Restrict Supply
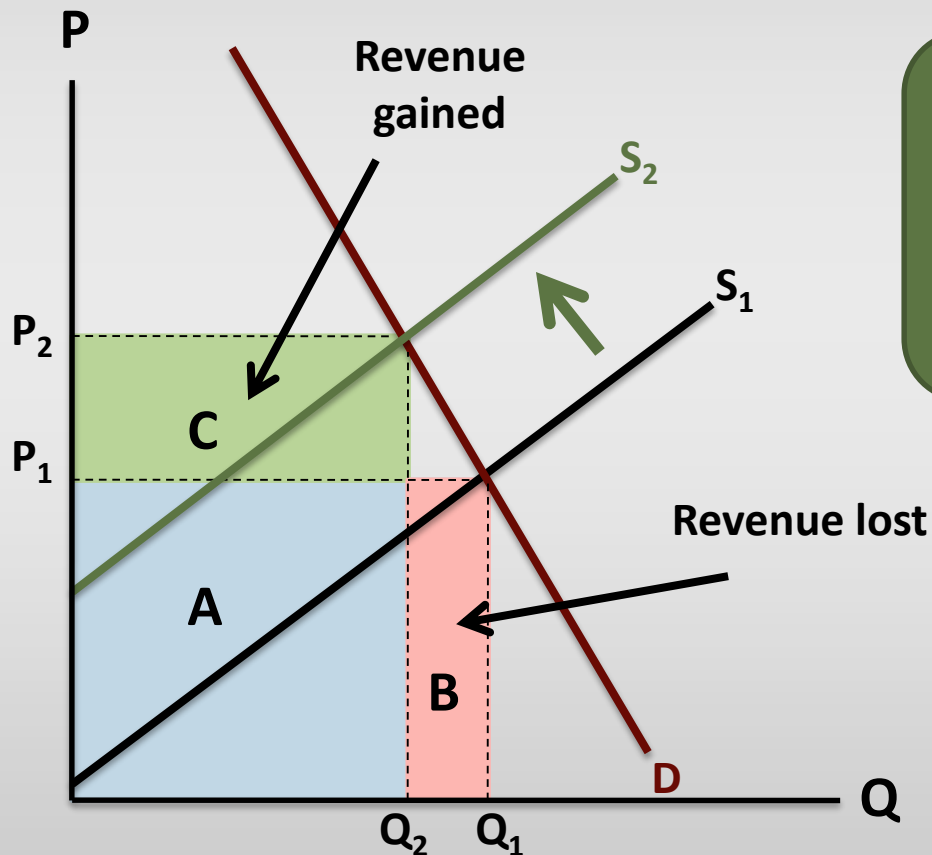
When demand is relatively inelastic, suppliers have incentive to restrict quantity to increase total revenue

Inelastic Supplies and Incentives to Restrict Prices

- **When supply is inelastic, consumers face significant price increases if their demand increases**
- When supply is **inelastic** and demand increases, prices increase causing consumers to lobby for **price controls**
  - Rent control in New York City is an example

Application: Price Floors and Elasticity

The surplus created by a price floor is larger if demand and supply are elastic
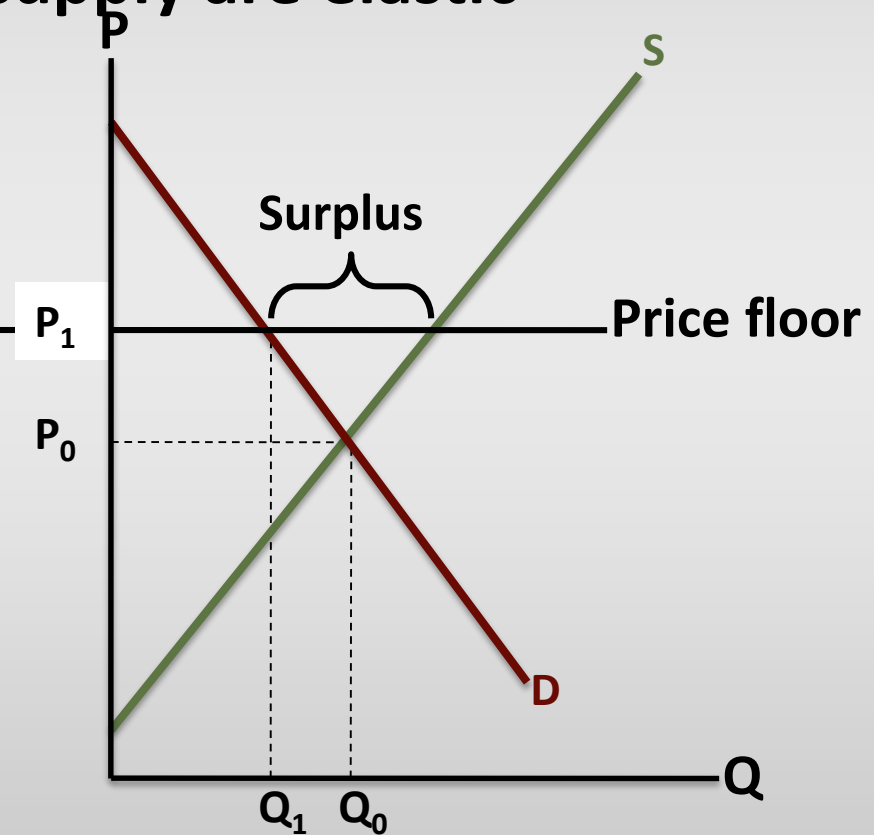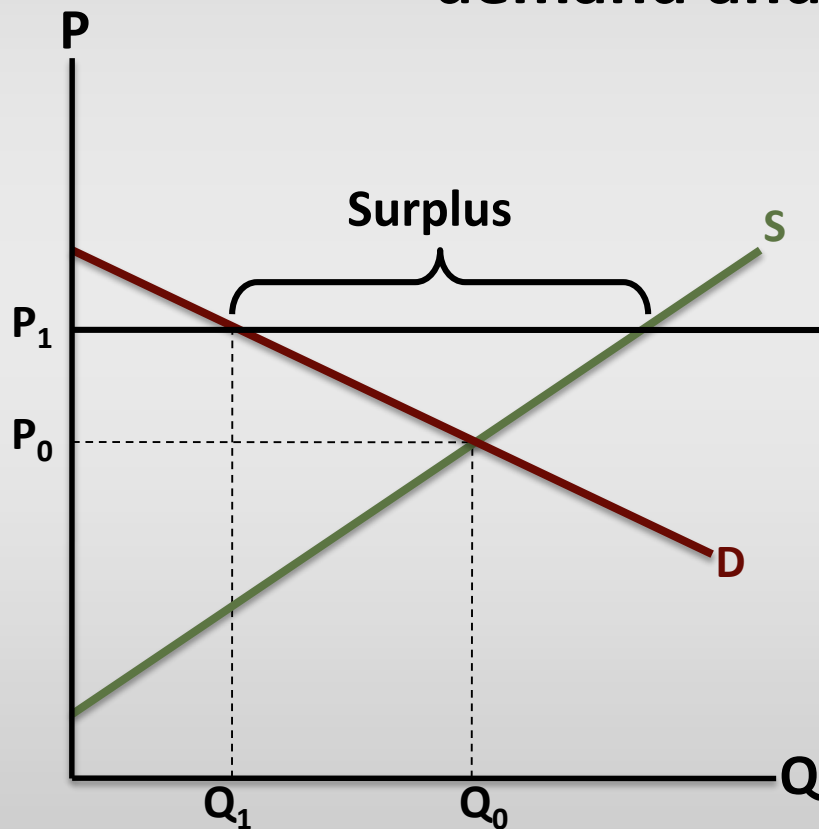
Long-Run and Short-Run Effects on Price Control

- **In the short run, demand and supply are generally inelastic**
  - **This makes a price ceiling look like it will not create a problem**
    - **But in the long run, supply is generally elastic**
    - **A price control would alleviate the short run problem but in the long run the shortage would become more severe**

Chapter Summary

- **Consumer surplus is the net benefit a consumer gets from purchasing a good**
- **Producer surplus is the net benefit a producer gets from selling a good**
- **Equilibrium maximizes the combination of consumer and producer surplus**
- **Taxes create a loss of consumer and producer surplus known as deadweight loss, which is graphically represented by the welfare loss triangle**

Chapter Summary

- **The cost of taxation to consumers and producers includes the actual tax paid, the deadweight loss, and the costs of administering the tax**

- **Relative elasticities determine who bears the burden of the tax. The more inelastic one's demand or supply, the larger the burden of the tax**

- **Price ceilings and floors, like taxes, result in loss of consumer and producer surplus**

Chapter Summary

- **Price ceilings transfer producer surplus to consumers; they are a tax on producers and a subsidy to consumers**

- **Price floors transfer consumer surplus to producers; they are a tax on consumers and a subsidy to producers**

- **The more elastic supply and/or demand is, the greater the surplus with an effective price floor and the greater the shortage is with an effective price ceiling**