Government meets Market

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Announcements

- Assigned reading:
  - Textbook, Chapter 6, 8
- Problem set 4
  - Ch5: 2-7, 11, 16, 18
  - Ch6: 1-8, 11-13
  - Due dates will be announced on CANVAS.

Price Control – Intervening Price Signal

- Gov't may believe the equilibrium price determined by free-market is not "desirable" or "appropriate", and try to intervene.
- Rent control (price ceiling)
  - Price ceiling: A legal maximum on the price at which a good can be sold.
- Minimum wage (price floor)
  - Price floor: A legal minimum on the price at which a good can be sold.

Price Control – Intervening Price Signal

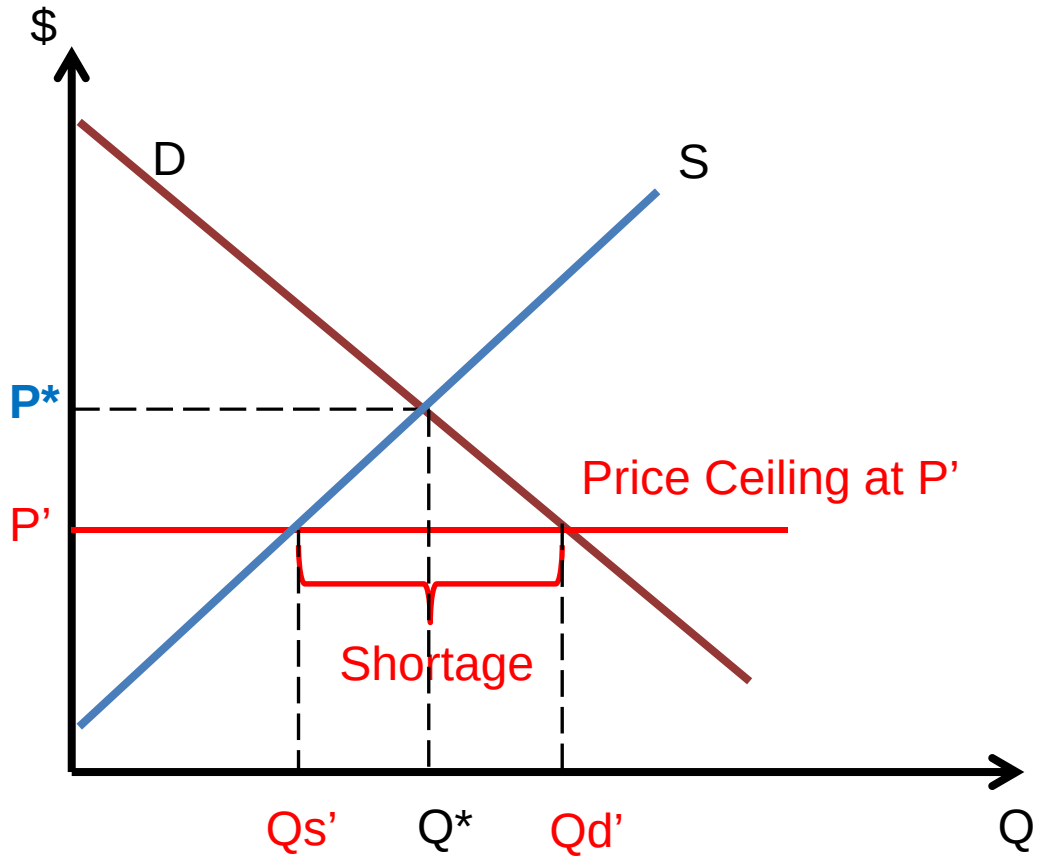
Gov't's reasons to intervene market price:

- Talking publicly
  - Protect disadvantageous buyers (usually with low income / purchasing power).
  - Protect disadvantageous workers (usually low skilled labor).
- From the "bottom" of gov't heart
  - Under pressure (election) from special interest groups (Vote!!!)

RENT CEILING – PRICE CEILING

Rent Control – Price Ceiling

- **P*** is the free-market price.
- Gov't imposes a price ceiling at **P'.**
- At **P'**, quantity demanded (**Qd'**) and quantity supplied (**Qs'**), or Qd' > Qs' → **Shortage!!!**

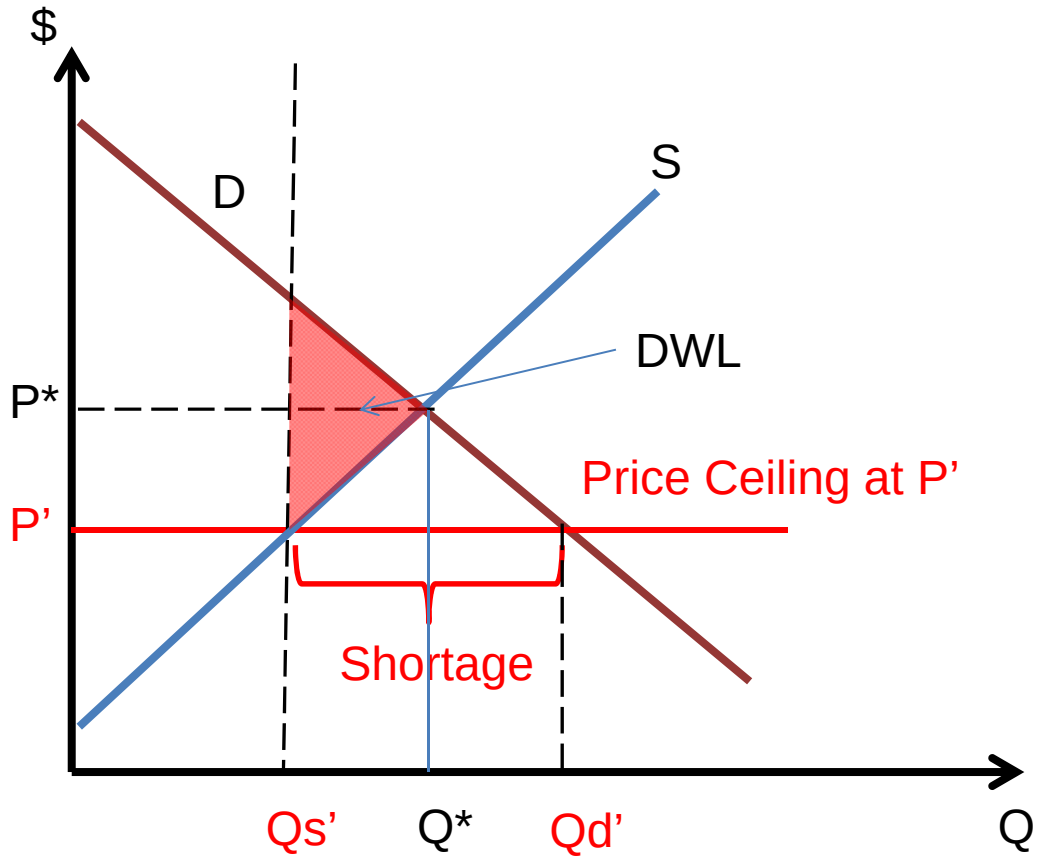


Rent Control – Price Ceiling

- In response to government's regulated price (P'), quantity supplied reduces to Qs'.
  - Lower price provides less "incentive" to the landlords to lease their apartments.
- On the other hand, buyers (renters) want a larger quantity (higher Qd at Qd').

Rent Ceiling – Price Ceiling

- Less apartments will be transacted in the market.
  - Qs' < Q*
  - Deviation from the Q*, where total surplus is maximized.
  - **Dead-weight-loss (DWL)** arises as mutually beneficial exchange cannot be realized.
- Who (buyers) will get apartments?



A Housing Market with a Rent Ceiling

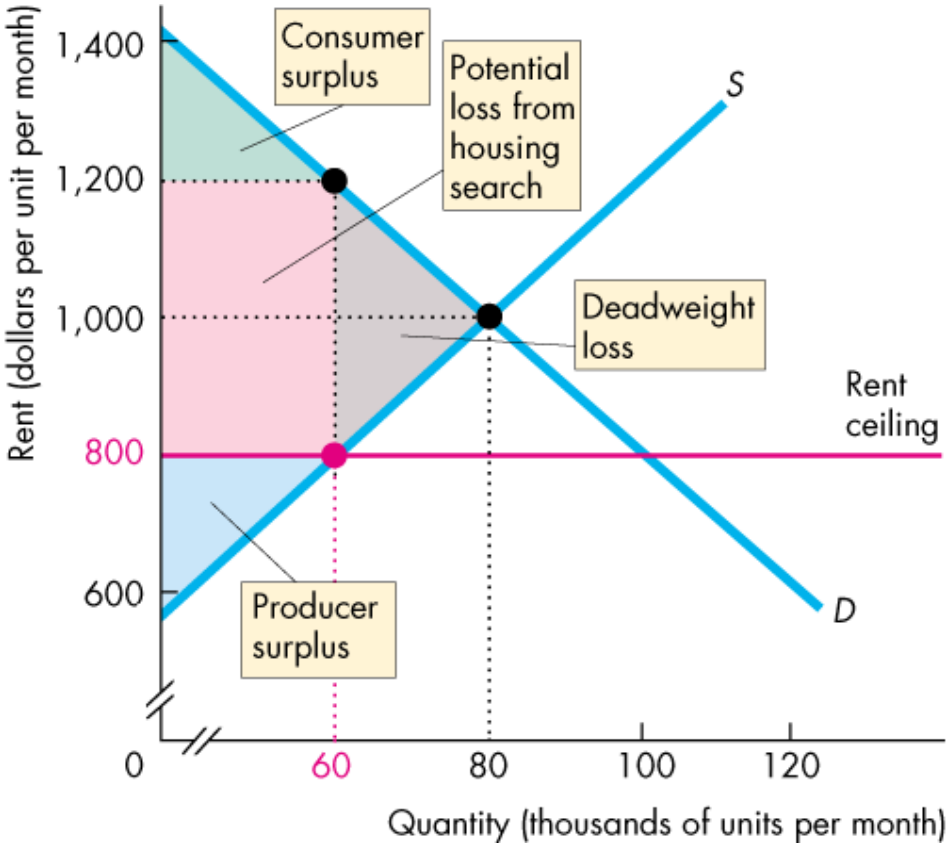
A rent ceiling decreases the quantity of housing supplied to less than the efficient quantity.

A deadweight loss arises.

Producer surplus shrinks.

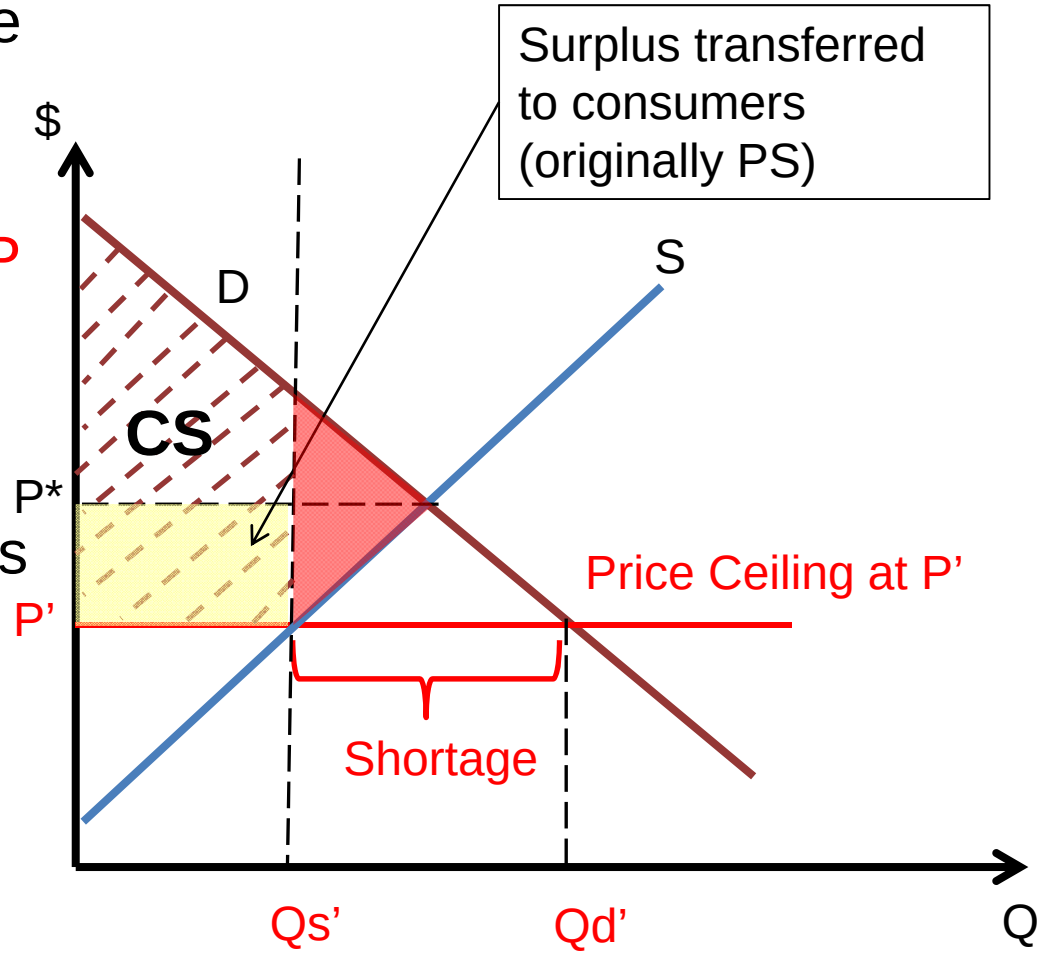
Consumer surplus shrinks.

There is a potential loss from increased search activity.



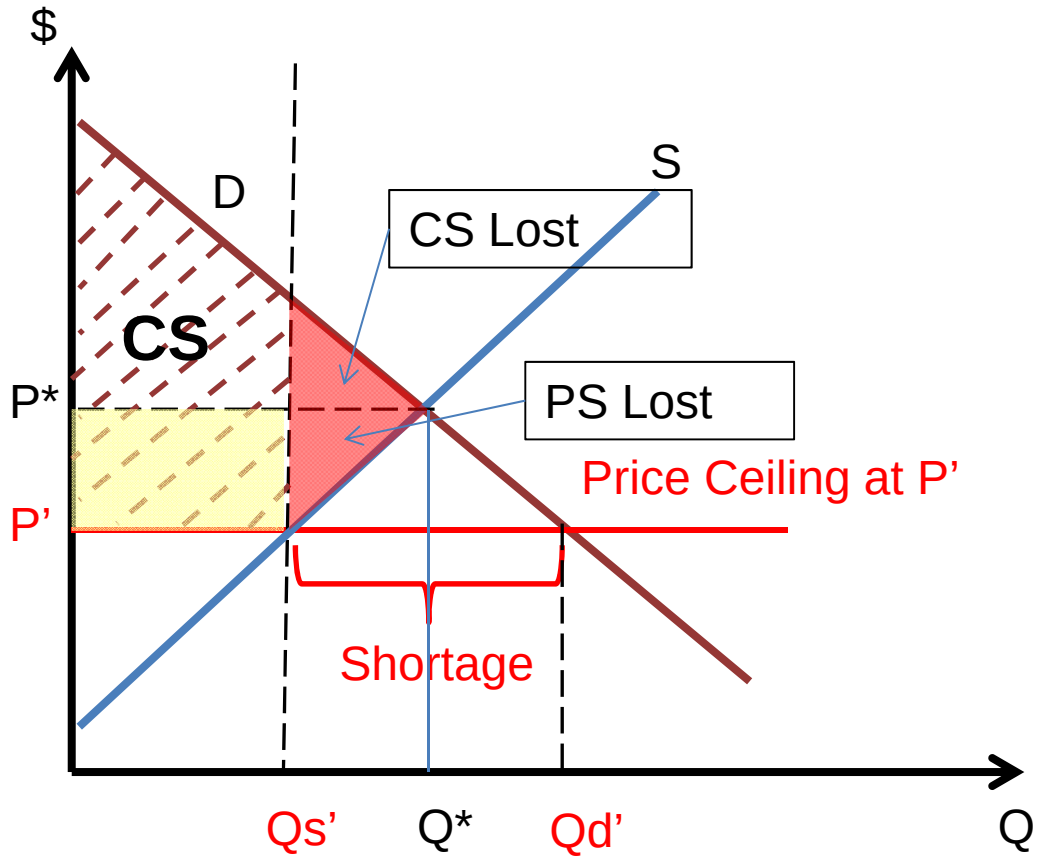
Rent Ceiling – Price Ceiling

- Given Qs' is the # of apartments available in the market under P',
- Rent ceiling is enforced.
- Suppose the "highest WTP consumers" get apartments, rent control transfers surplus from producers to consumers as shown (yellow-shaded).
- Still just "**reallocation**" of surplus among buyers & sellers.
- CS is the area with red-dashed lines.



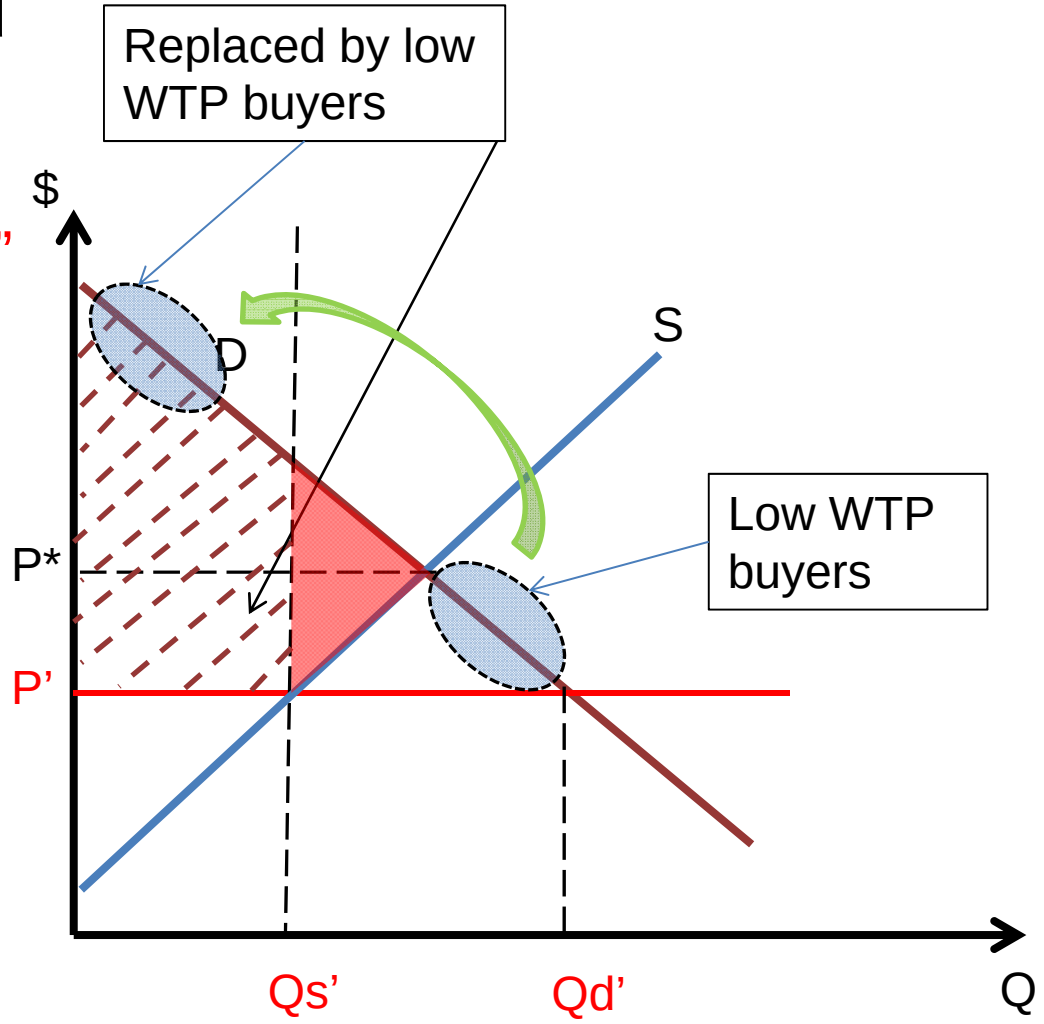
Rent Ceiling – Price Ceiling

- But, due to quantity reduction: Qs'<Q*,
- Some mutually beneficial exchange **CANNOT** happen.
- Dead-Weight Loss (DWL):
  - Upper part: Loss of CS
  - Lower part: Loss of PS
- Loss to **BOTH** buyers and sellers (society's loss)



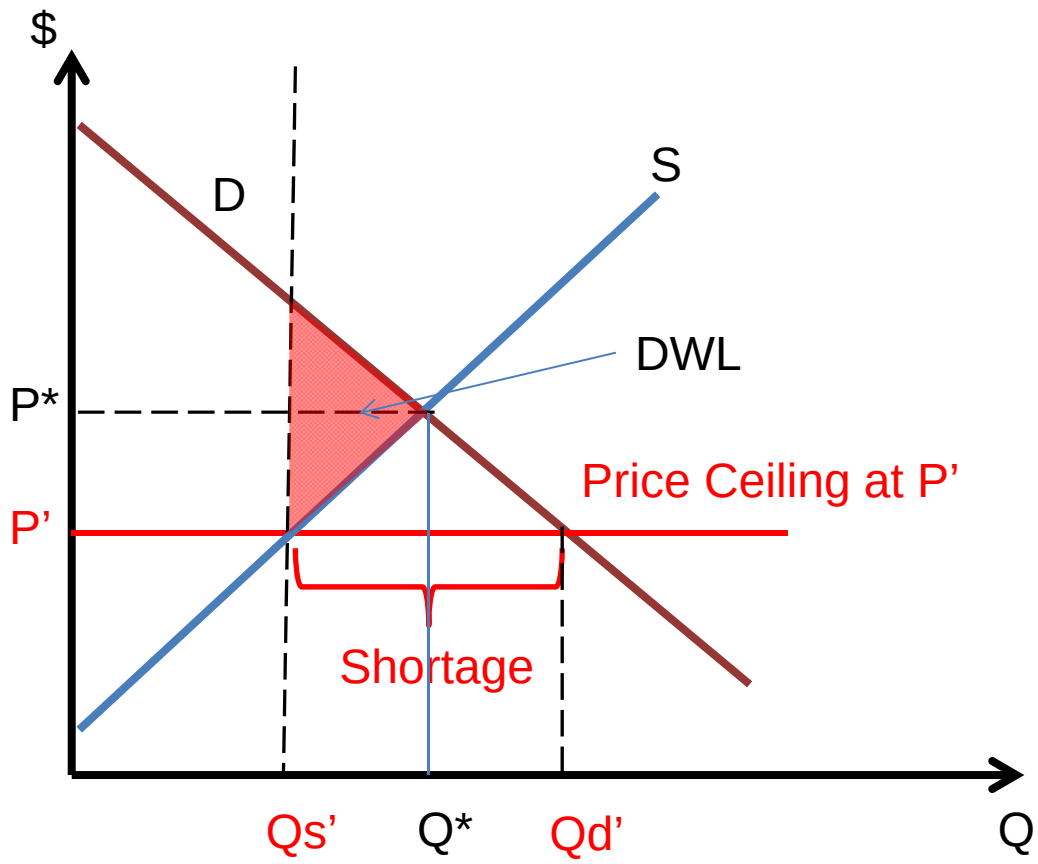
Rent Ceiling – Price Ceiling

- **Even worse**, we assumed the highest WTP can get the apartments.
- Under price control, "price" cannot function to solve "shortage" problem.
- If certain non-price rationing methods lead to low WTP getting the apartment,
- E.g. Lottery arranged by the government
  - Further loss of surplus!
  - Size of CS will further shrink.



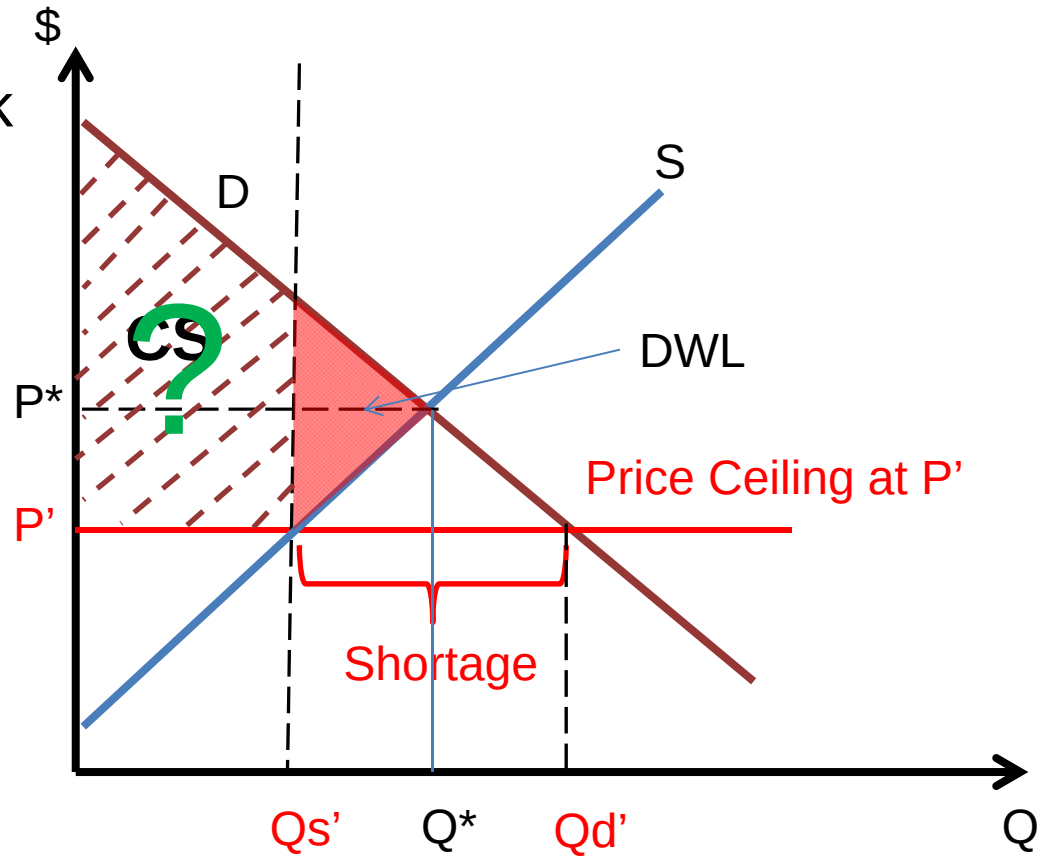
Rent Ceiling – Price Ceiling

- **HOWEVER,** other **non-price rationing** methods could appear to handle the "shortage" problem.
- Who has the bargaining power?
  - Black market (charge a price above P' illegally): Under table payment
  - Grey-area payment: Key&lock-money, shoe-money
- What determines the highest black market payment?



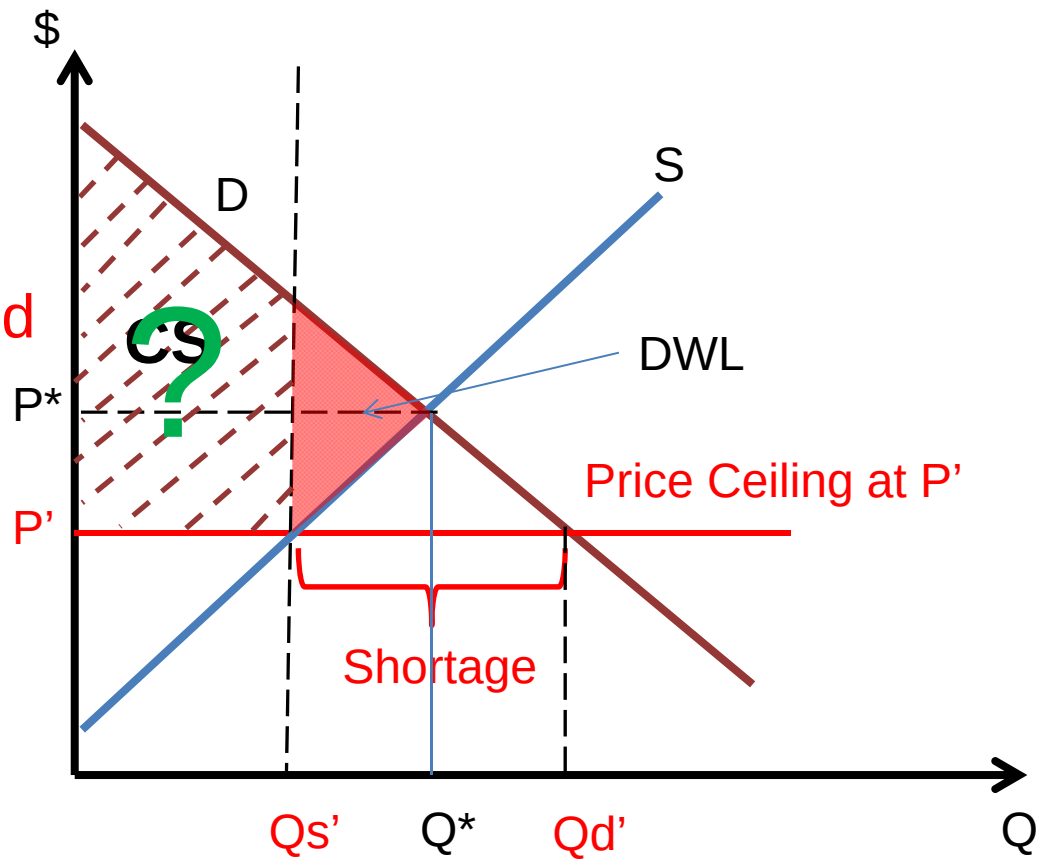
Rent Ceiling – Price Ceiling

- Who is **able** to pay: The highest WTP buyers!
- Non-price rationing methods transfer CS back to sellers' hands.
- If black-market & grey-area payment **cannot** be effectively prohibited by the government, it is possible that a big part of the CS (dash red-line area) to be transferred back to sellers.



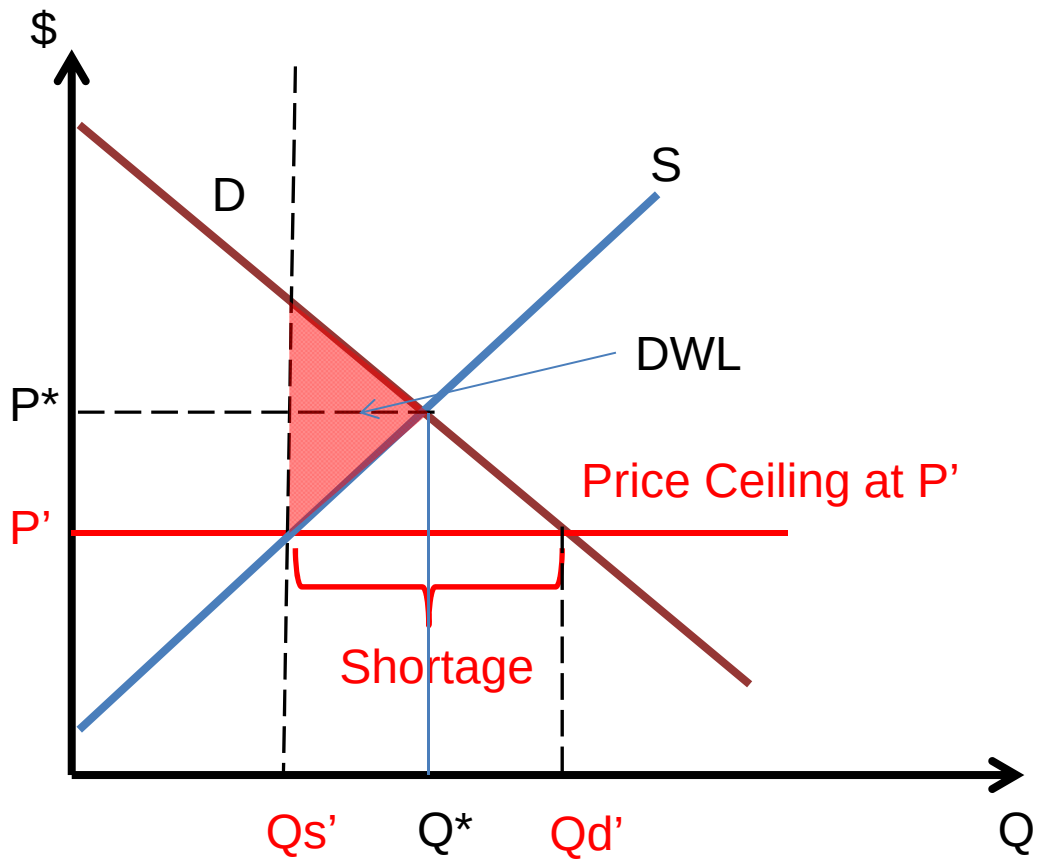
Rent Ceiling – Price Ceiling

- Max amount of "black/grey market payment" that buyers are willing to pay?
  - Highest WTP!
- With black market, resources can be allocated more efficiently.
- Black market (payment) guarantees resources to be rationed to highest WTP buyers.



Rent Ceiling – Price Ceiling

- Wait! If black/grey market payment is so common/prevalent,
- Or, if government cannot effectively enforce its rent ceiling policy,
  - Extreme case: Back to Q* and P*!
- Not-extreme case: With black market payment, the amount received by landlord is more than P'.
  - Qs > Qs'



Can rent ceiling help/benefit buyers?

- Buyers gain??? Who can get apartments? Who can pay a lower price?
  - Less buyers can rent apartments under rent ceiling: Qs' < Q*.
  - Bring us more fairness?
  - Those "Lucky" buyers may have to pay black-market rent or "grey-area payments" – possible that most of CS will be transferred (back) to sellers as a result, unless … …
- DWL means a total loss to society.
  - Some mutually beneficial trade cannot happen!

Explanatory Note – Summary

- **IF** rent ceiling can be effectively enforced by the government, then P' would be the rental payment that would be paid by buyers and received by the sellers, and Qs' will be the # of apartment available in the market
- Qs' < Q*, DWL happens (reduction in social welfare as measured by the size of social surplus).
- Since price mechanism has been restricted by the government, non-price rationing methods will appear to "solve" the shortage problem. If such non-price rationing methods do not allocated apartments to highest WTP buyers, the size of social surplus would further reduce (further loss on top of DWL).

Explanatory Note – Summary

- However, we know that government's enforcement is never perfect. Black/Grey market appears as a non-price rationing method under the existence of shortage.
- At Qs', the black market payment + P' can be as large as the WTP of buyers, which means:
  - Black market payment transfers surplus back to sellers (If just a redistribution of surplus, it does not affect efficiency).
  - Highest WTP buyers will "win" by (biggest amount) black market payment, and be allocated with apartments (non-price rationing methods can be used, but eventually will be related to price/money).
- Therefore, black market payment allows efficient allocation of apartments (highest WTP buyers), though surplus will be largely transferred into sellers' hands.

Explanatory Note – Summary

- Think further, with black/Grey market payment, the rents received by sellers could be larger than P', so quantity supplied could be higher than Qs', therefore DWL can be reduced (closer to Q*, improving efficiency).
  - In the extreme case, if government does nothing to enforce the rent ceiling, P* and Q* could still be the market outcome.
- Black market serves as a mean to improve the efficiency of allocation of apartments under rent control.
- Another example: iPhone (resell to mainland by those Hong Kong buyers who won the "lucky-draw" by Apple)

Rent ceiling – Short and Long run

Long run

- Shortage problem getting better or worse???

Rent ceiling – Short and Long run

(a) Rent Control in the Short Run
(supply and demand are inelastic)

(b) Rent Control in the Long Run
(supply and demand are elastic)

Rent ceiling – Short and Long run

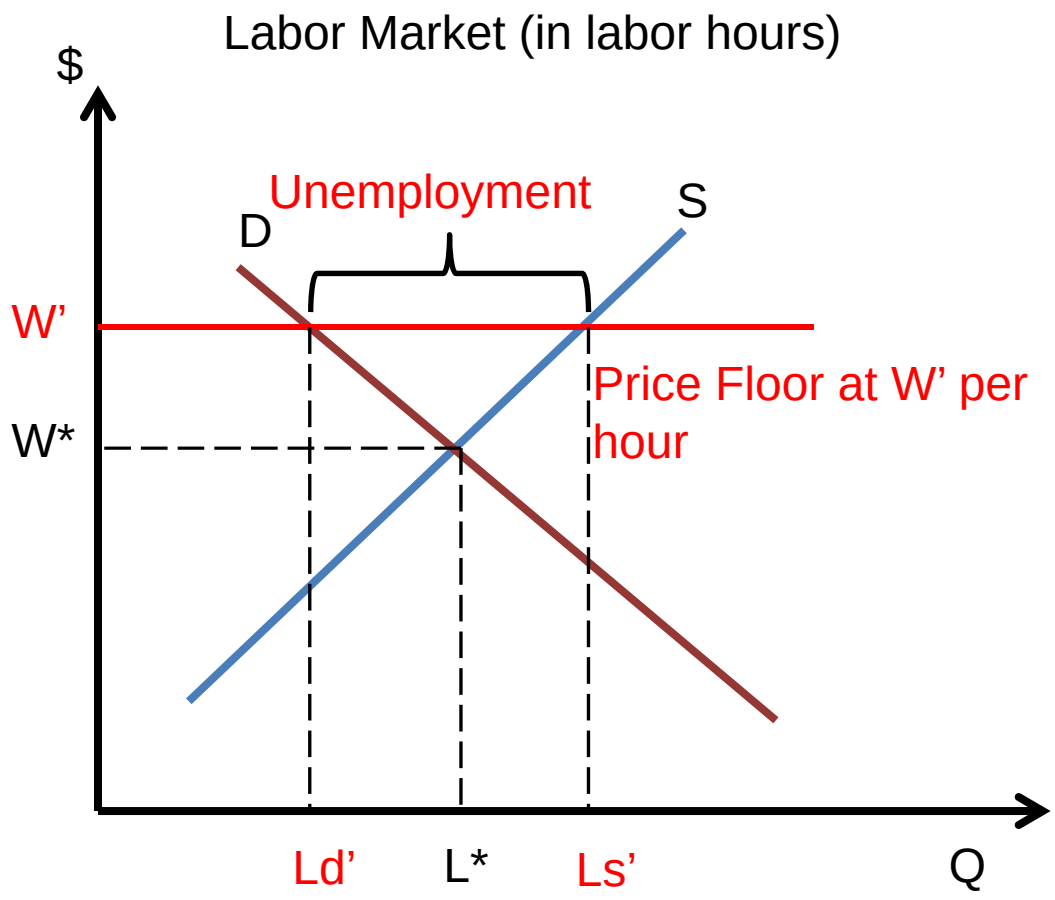
Long run

- Poor maintenance on rental apartment (a mean to increase the net income generated from apartments) in response to lower than equilibrium price level
  - The best way to destroy a city is by rent control ☺ !

MINIMUM WAGE – PRICE FLOOR

Minimum Wage – Price Floor

- Gov't imposes a price floor at **W'**, above the market wage at **W*.**
- At W', quantity supplied of labor (**Ls'**) > quantity demand (**Ld'**) or "**Excess Supply**" or "**Surplus**".
- In labor market, the surplus represents "**unemployment**": People who want to get a job cannot find one.



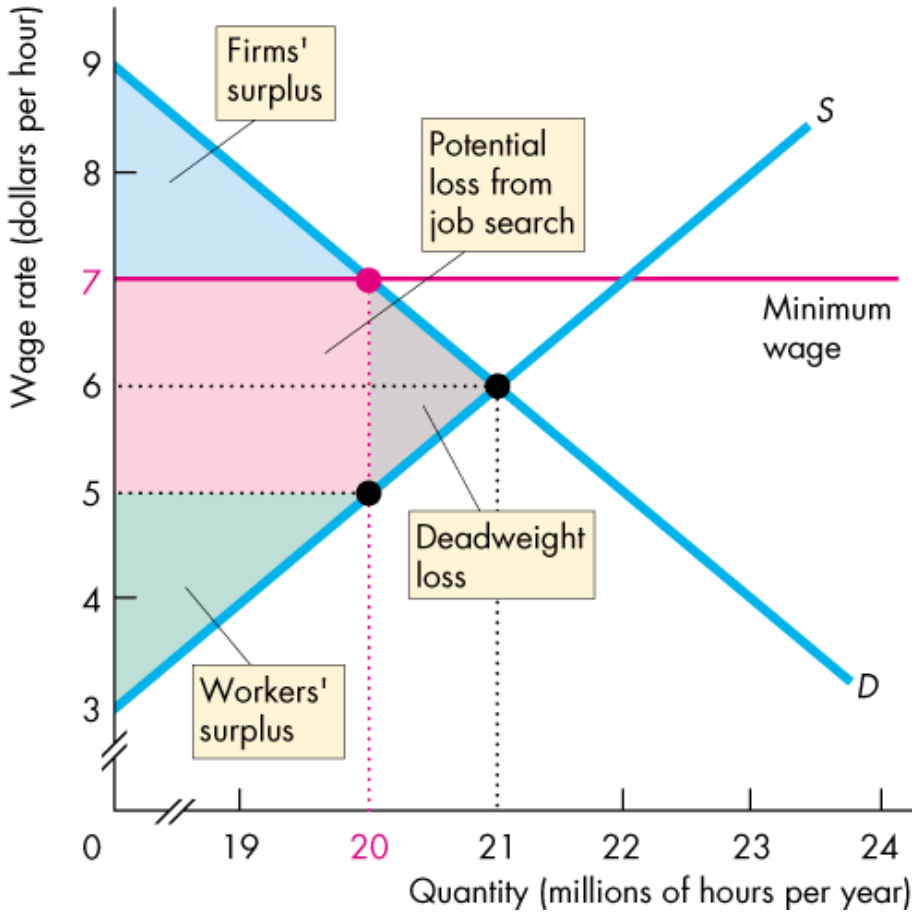
A Labor Market with a Minimum Wage

A minimum wage set above the equilibrium wage decreases the quantity of labor employed.

A deadweight loss arises.

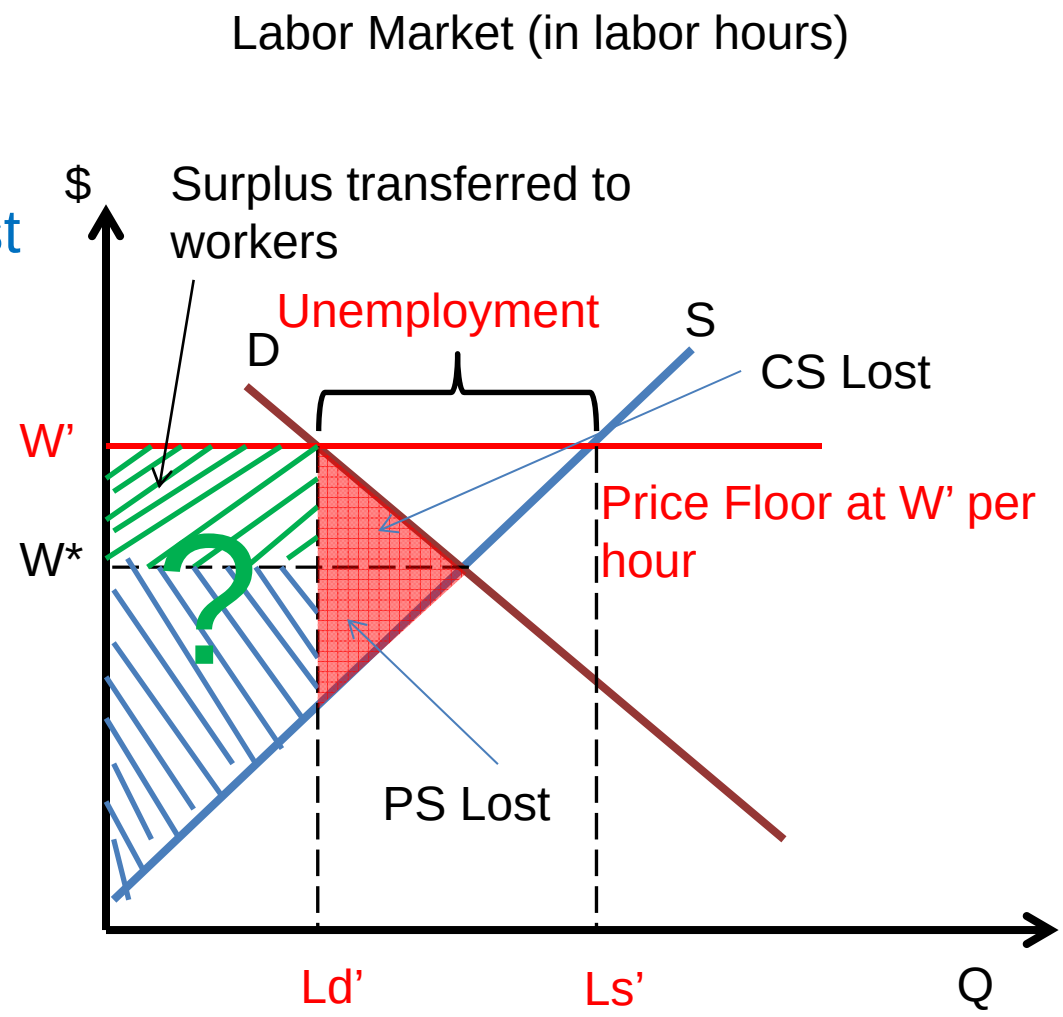
The potential loss from increased job search decreases both workers' surplus and firms' surplus.

The full loss is the sum of the red and gray areas.



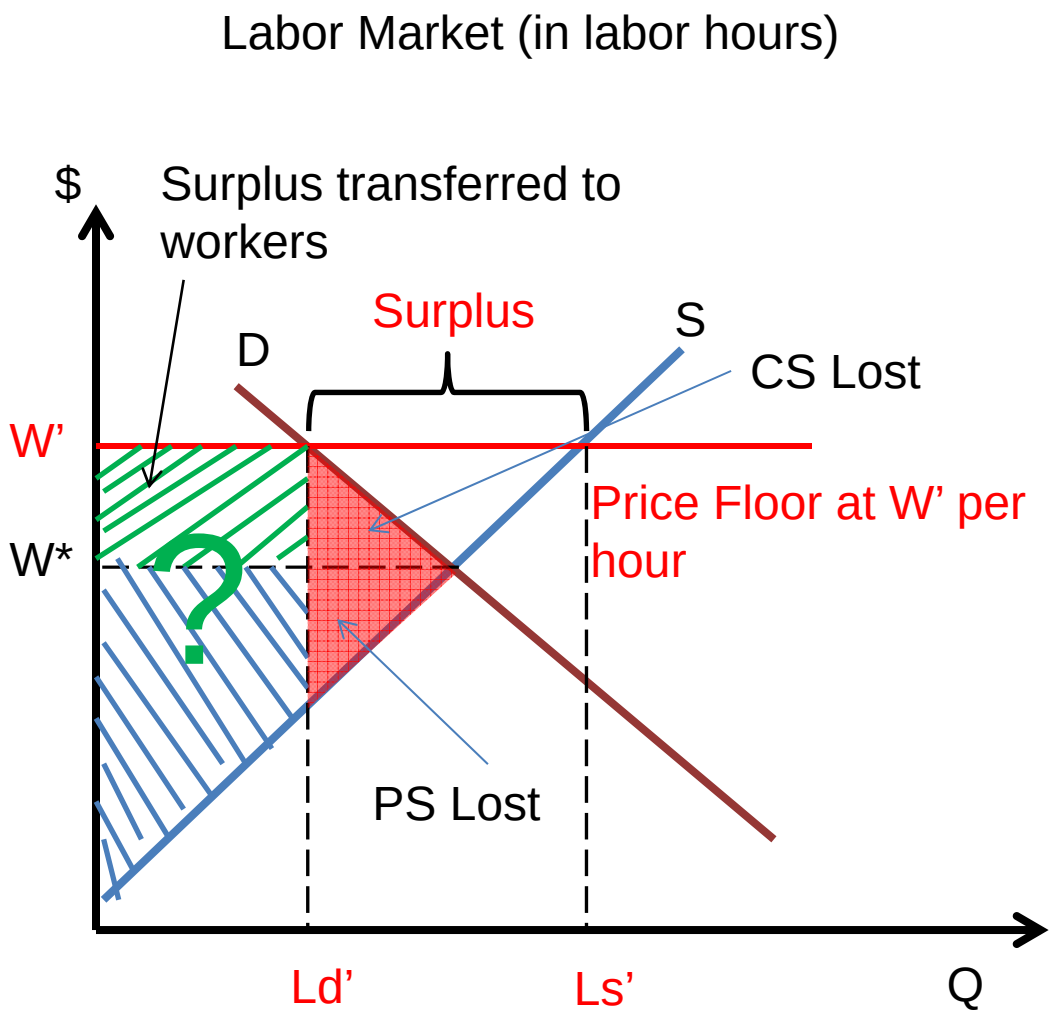
Minimum Wage – Price Floor

- Green and blue shaded areas are PS under minimum wage for those who have lowest WTA/cost get employment.
- If **NOT** the lowest WTA/cost labors get employment, PS will be smaller.
- Red shaded area = DWL (CS and PS loss), some mutually beneficial trade cannot happen.



Minimum Wage – Price Floor

- Black market can happen (below W' wage) or workers may "pay" to get a job.
- If government enforcement is not effective, surplus will be transferred back to employers (black market payment).
- With black market wage, quantity demand of labor could be higher than Ld'.



Can minimum wage help workers?

- Workers gain??? Who can get jobs? Who receive higher wage?
  - Less workers can get jobs under minimum wage: $Ld' < L^*$.
  - Those "lucky" workers may have to receive black-market wage or give "grey-area payments" to get jobs – possible that most of PS will be transferred to employers as a result.
  - Unfavorable to teenagers and elderly, or those will low productivity.

Minimum Wage on Teenage and Elderly Workers

- Economy contains **NOT** a single market but many different markets for different types of workers.
- Minimum wage on skilled and experienced workers has no impact, because market equilibrium wage in these markets is above the minimum wage (not effective).
- Teenage or elderly workers would be more likely to be affected, given equilibrium wage of some of them is below the minimum wage (effective).

Minimum Wage on Teenage and Elderly Workers

- Under effective minimum wage, some teenage or elderly workers would become “too expensive” for employers and become unemployed, or in other words,
- Under minimum wage, employers would try to avoid teenage or elderly workers.

Minimum Wage – Short and Long Run

In the Long-run

- Minimum wage (higher than equilibrium wage) will attract more people to join the job market.
  - Quit school earlier.
- From employers' perspective, higher labor cost may force some companies out of business and therefore reduce labor demand.
- Unemployment (surplus of labor) will become more serious.

Summary – Price Control

- Help disadvantageous groups???
  - **If** price control can be “effectively” enforced, those **can rent** an apartment and **keep** a job seems benefited – currently benefited groups.
- However, less people can rent an apartment and less people get employment.
- DWL – Certain mutually beneficial trade cannot happen, a total loss to both buyers & sellers.
  - Rent ceiling: Less than Q* can rent apartments.
  - Min wage: Less than L* can get employment.

Summary – Price Control

- **Both examples show** that people respond to incentives smartly.
  - Appearance of **non-price rationing methods** to "solve" shortage or surplus: Black market / grey-area payment, etc. may hurt parties that gov't originally want to help!
- Non-price rationing methods may further reduce the size of total surplus.
  - Waste on building connection, negotiation, searching, etc.

Summary – Price Control

- Other costs: Enforcement, administrative costs incurred by the government for the price control.

Therefore:

- Prices are the signals that guide the allocation of society's resources.
- Restrict it from functioning hurts!
  - Hurts what?
  - Voluntary exchange is essential!

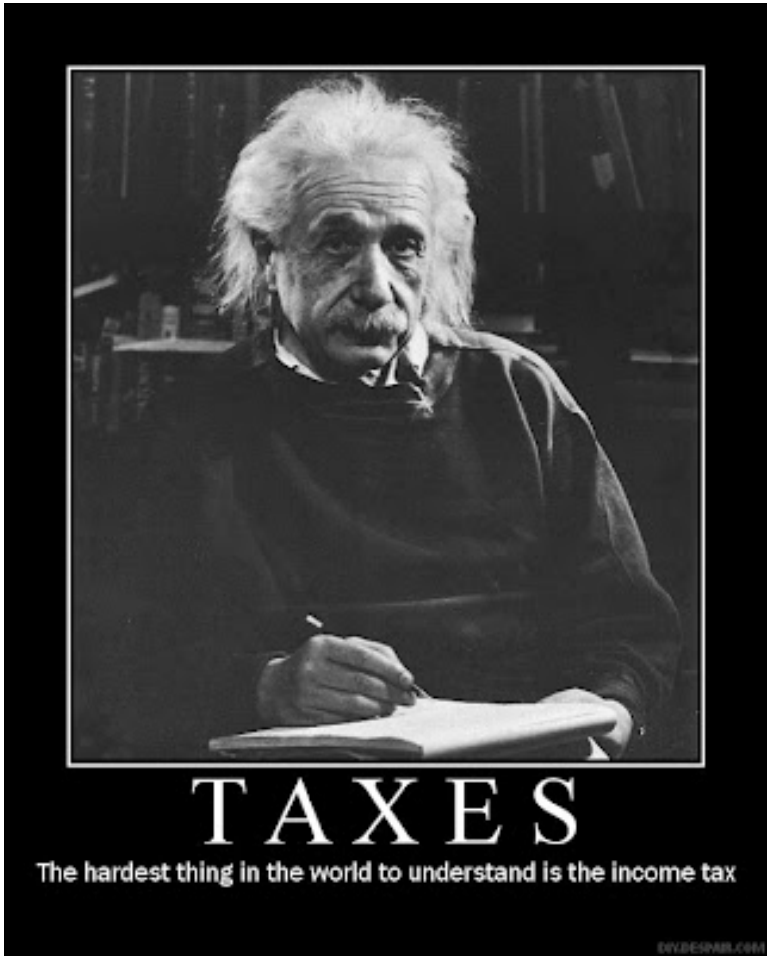
TAXATION

Another Gov't Policy: Taxation

"The Hardest Thing in the World to understand is the Income Tax"

by

Albert Einstein



Taxation

- Government's important source of funding
  - Legal system, infrastructure, military forces
- Government uses taxation as a policy tool.
  - Sales tax on cigarette to deter smoking
  - Tariffs to deter the amount of imports
  - Progressive income tax arrangement for redistribution purpose
- **EXAMPLES:** Corporate tax, income tax, sales tax, tariff (import tax), etc.

Taxation

- http://en.wikipedia.org/wiki/List_of_countries_by_tax_rates
- Questions we may have:
  - How tax affects our (sellers and buyers) behavior? How tax affects supply and demand? How tax affects the equilibrium market outcome?
  - When gov't is going to impose a tax, who is going to bear the tax burden (tax incidence)?

Taxation

- **Tax incidence**: the division of the burden of a tax between buyers and sellers
- When an item is taxed, its price might rise by the full amount of the tax, by a lesser amount, or not at all.
  - If the price rises by the full amount of the tax, buyers pay the tax.
  - If the price rises by a lesser amount than the tax, buyers and sellers share the burden of the tax.
  - If the price doesn't rise at all, sellers pay the tax.

Taxation

- We always hear that from gasoline sellers, cigarette producers, airlines (on carbon tax).

"When government is going to impose such a tax, the tax burden, as extra cost, will be shifted to consumers."

- Do you believe in that?

Question

- If HK Gov't is going to impose a tax on iPhone (e.g. per headset HK$500), who is going to bear this tax burden (Tax incidence)?

1) iPhone sellers
2) Consumers (i.e. YOU)
3) 1 & 2
4) None of the above

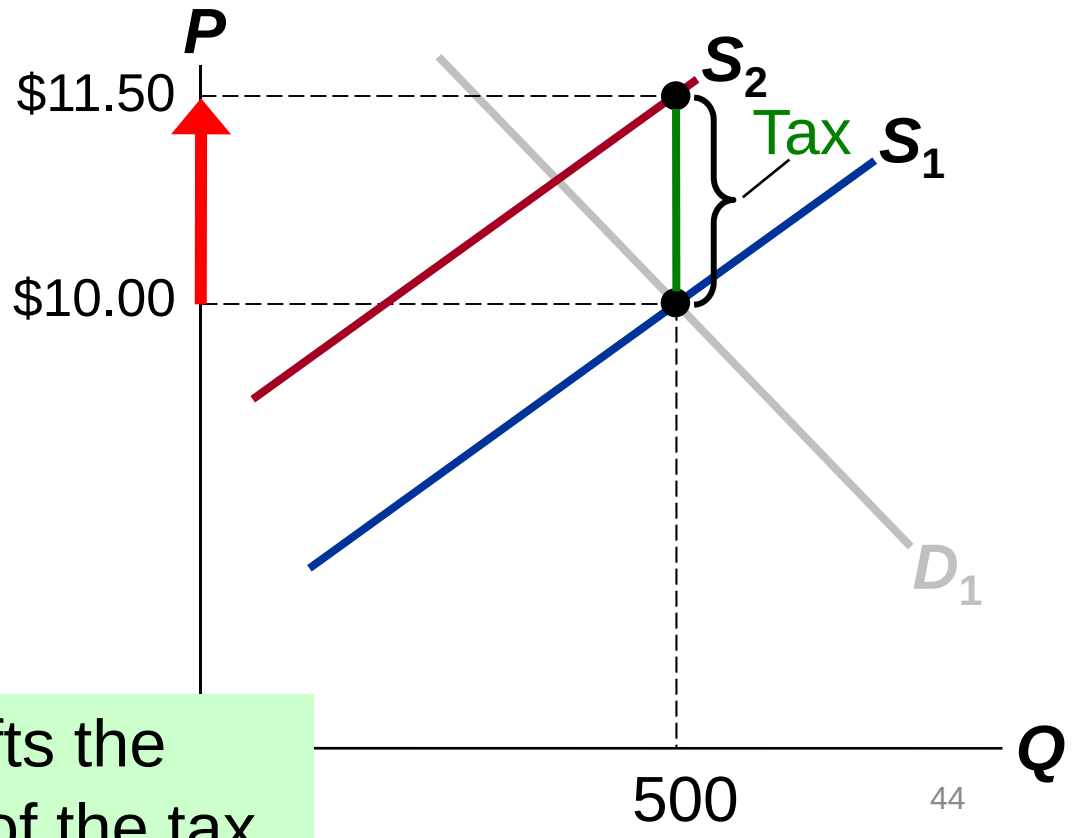
Tax on a good

- If HK Gov't is to levy a tax on iPhone, will the tax be collected from sellers or buyers?
  - Any difference if the tax is collected from sellers or buyers?
- From administrative perspective:
  - Number of sellers and buyers: Buyers > Sellers
  - Lower administrative cost if tax is levied on sellers.
- Tax can be % of a good's price or a specific amount for each unit sold (**per-unit tax**).
- Here, for simplicity, we analyze per-unit tax.

Tax on Sellers

- Gov't announces a $1.5 per unit tax on **sellers.**
- Sellers take into account this "extra-cost" into their WTA:
- For the 500th unit, WTA = $10, with $1.5 tax, you are willing to accept WTA+$1.5 (**yes, you really want to shift the burden to buyers!!!**).

Effects of a $1.50 per unit tax on sellers



Hence, a tax on sellers shifts the ***S*** curve up by the amount of the tax.

Tax on Sellers

New Equilibrium:

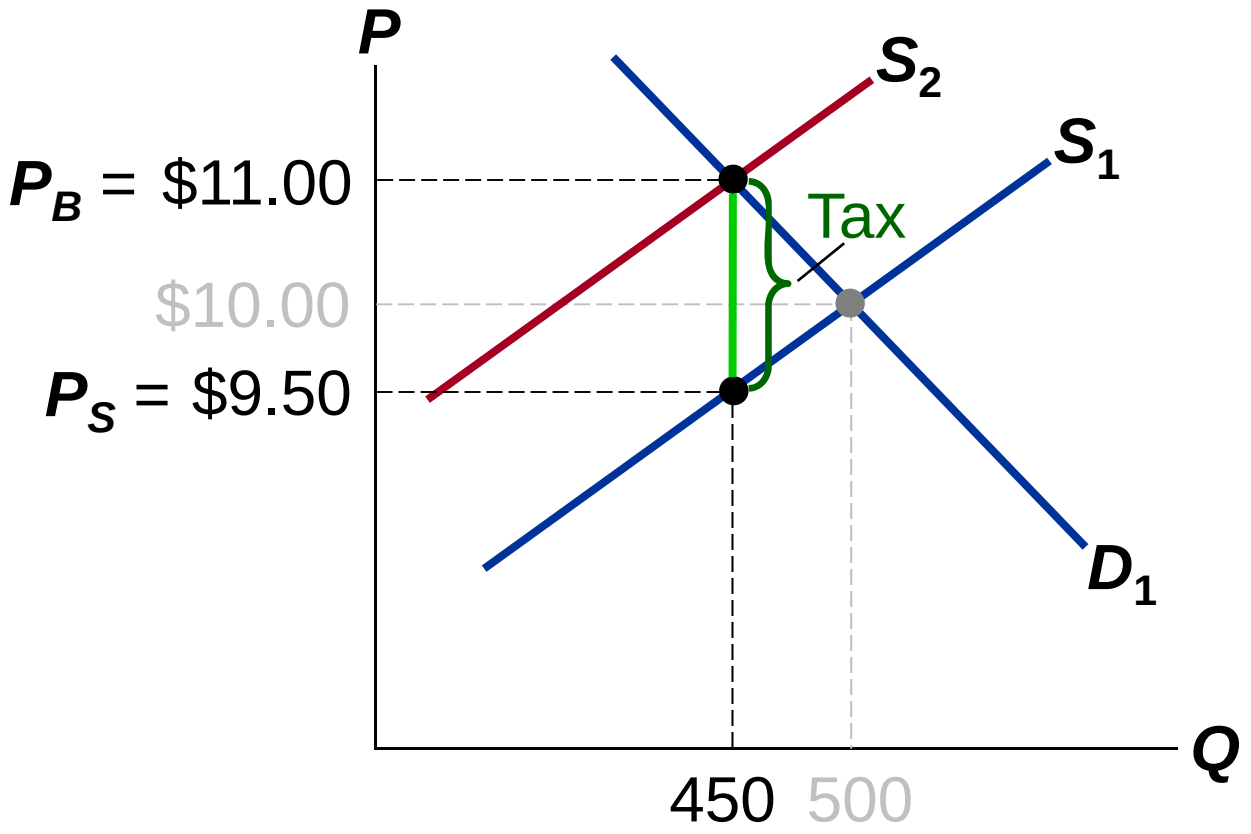
$Q = 450$

Buyers pay
$P_B = \$11.00$

Sellers receive
$P_S = \$9.50$

Difference between them
= \$1.50 = tax

Effects of a \$1.50 per unit tax on sellers



The Tax Incidence – Tax on Sellers

How burden of a tax is shared among buyers and sellers:

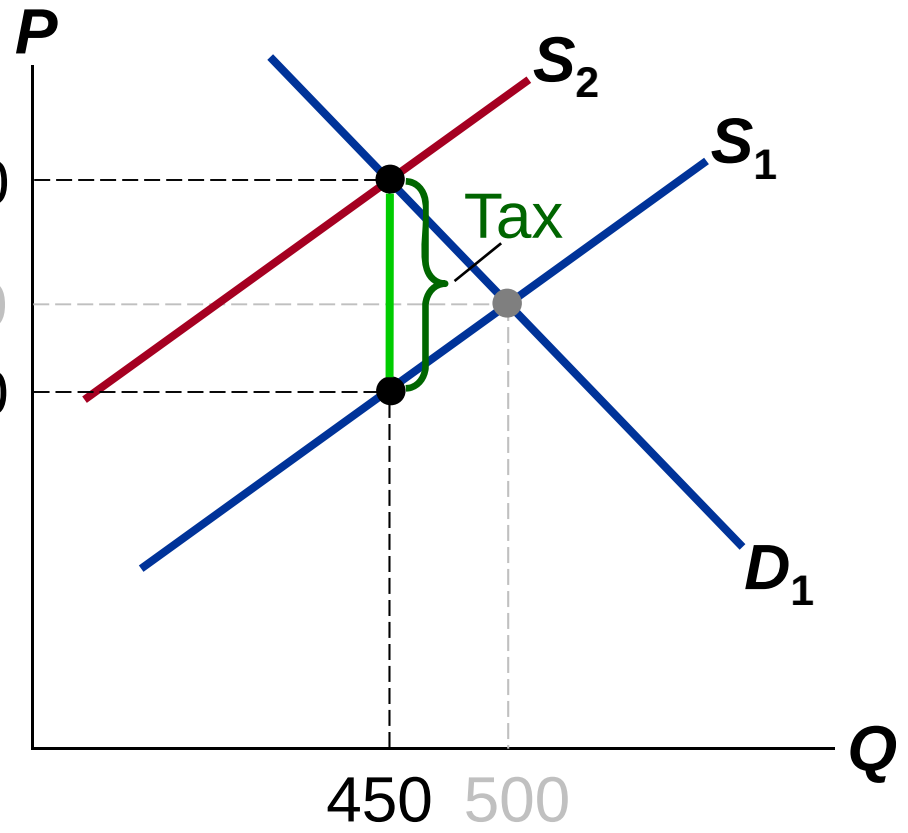
Buyers pay
P_B = \$11.00

Buyer pay \$1 more

Sellers receive
P_S = \$9.50

Sellers receive \$0.5 less

Effects of a \$1.50 per unit tax on sellers

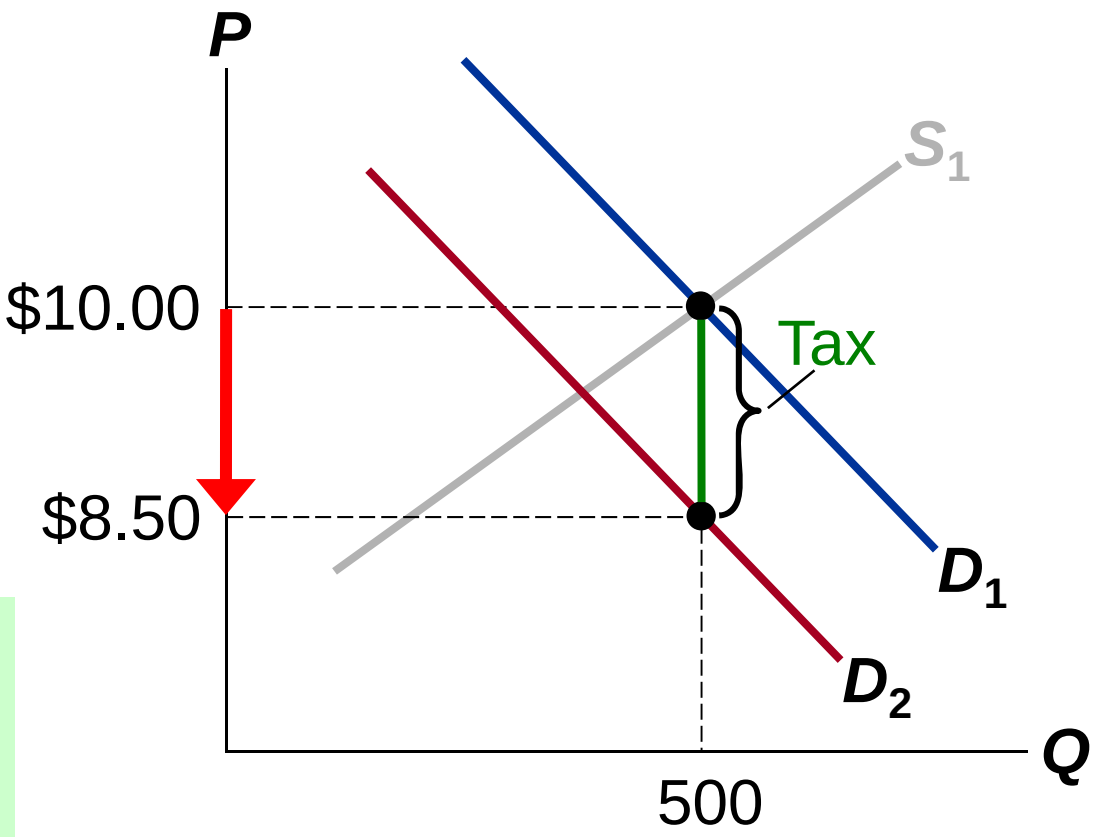


Tax on Buyers

- Gov't announces a $1.5 per unit tax on **buyers.**
- Buyers take into account this "extra-cost" into their WTP:
- For the 500th unit, WTP = $10, with $1.5 tax, you are willing to pay WTP-$1.5 to the sellers.

Hence, a tax on buyers shifts the ***D*** curve down by the amount of the tax.

Effects of a $1.50 per unit tax on buyers



Tax on Buyers

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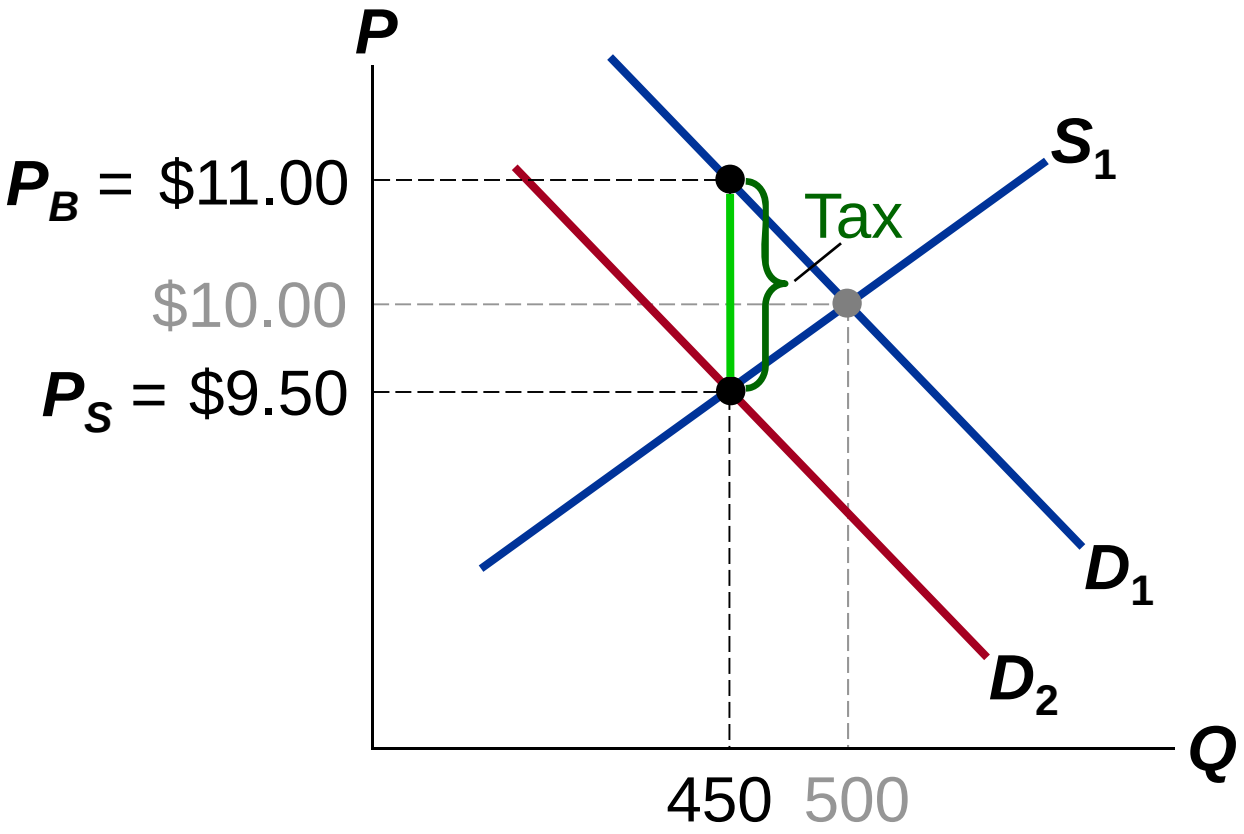
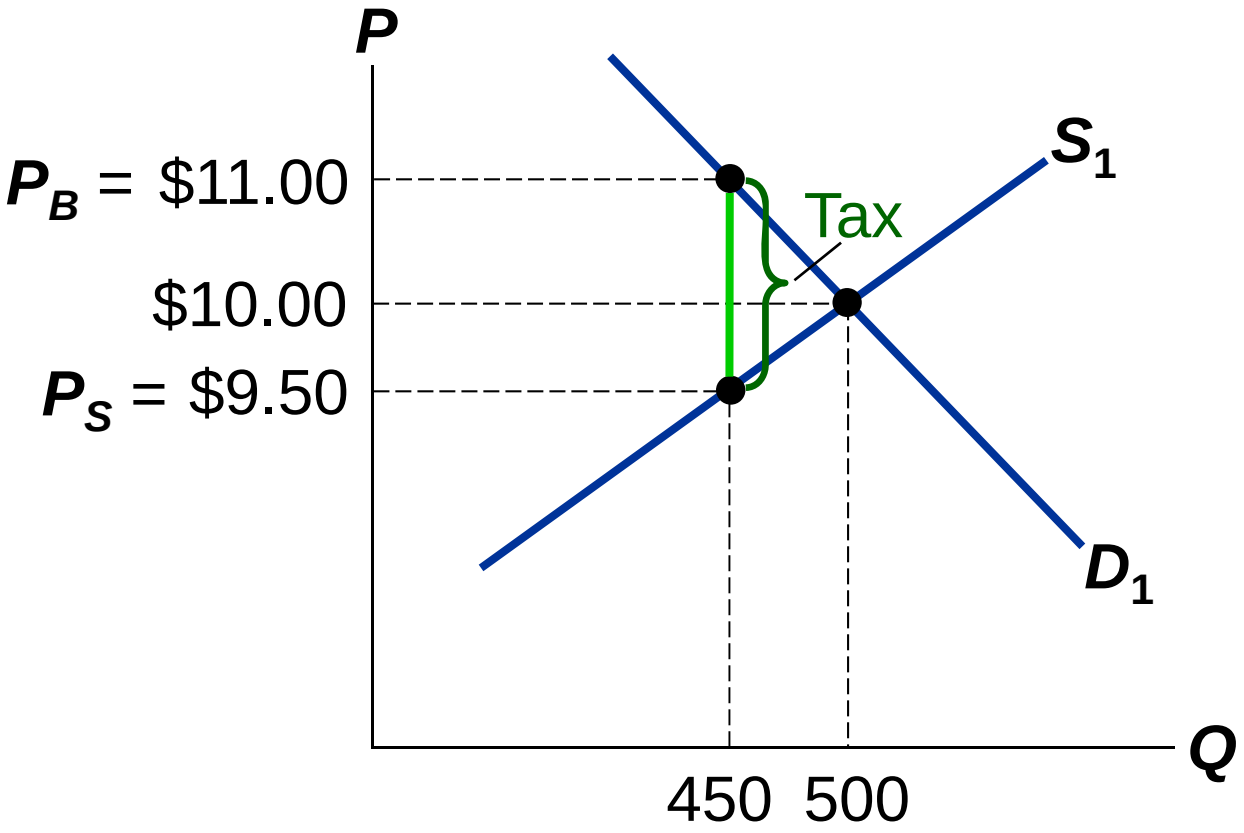


The Tax Incidence – Tax on Buyers

The effects on ***P*** and ***Q***, and the tax incidence are the **same** whether the tax is imposed on buyers or sellers!

What matters is ???



Tax Incidence

- Taxing on buyers or sellers will deliver the same outcomes!
  - P_B = \$11, P_S = \$ 9.5
  - Quantity transacted = 450
  - Tax revenue = \$1.5 x 450
- **Then, what factor(s) has(have) impact on the tax incidence?**

Elasticity and Tax Incidence

Special Case: Perfectly Elastic Demand

- A “perfectly elastic” demand curve is a horizontal line.
- Tax on sellers, how will

the sales tax burden be

divided?

Elasticity and Tax Incidence

Perfectly Inelastic Demand

- A “perfectly inelastic” demand curve is a vertical line.
- Tax on sellers, how will

the sales tax burden be

divided?

Elasticity and Tax Incidence

Special Case: Perfectly Elastic Supply

- A “perfectly elastic” supply curve is a horizontal line.
- Tax on sellers, how

the sales tax burden be

divided?

Elasticity and Tax Incidence

Perfectly Inelastic Supply

- A “perfectly inelastic” supply curve is a vertical line.
- Tax on sellers, how

the sales tax burden be

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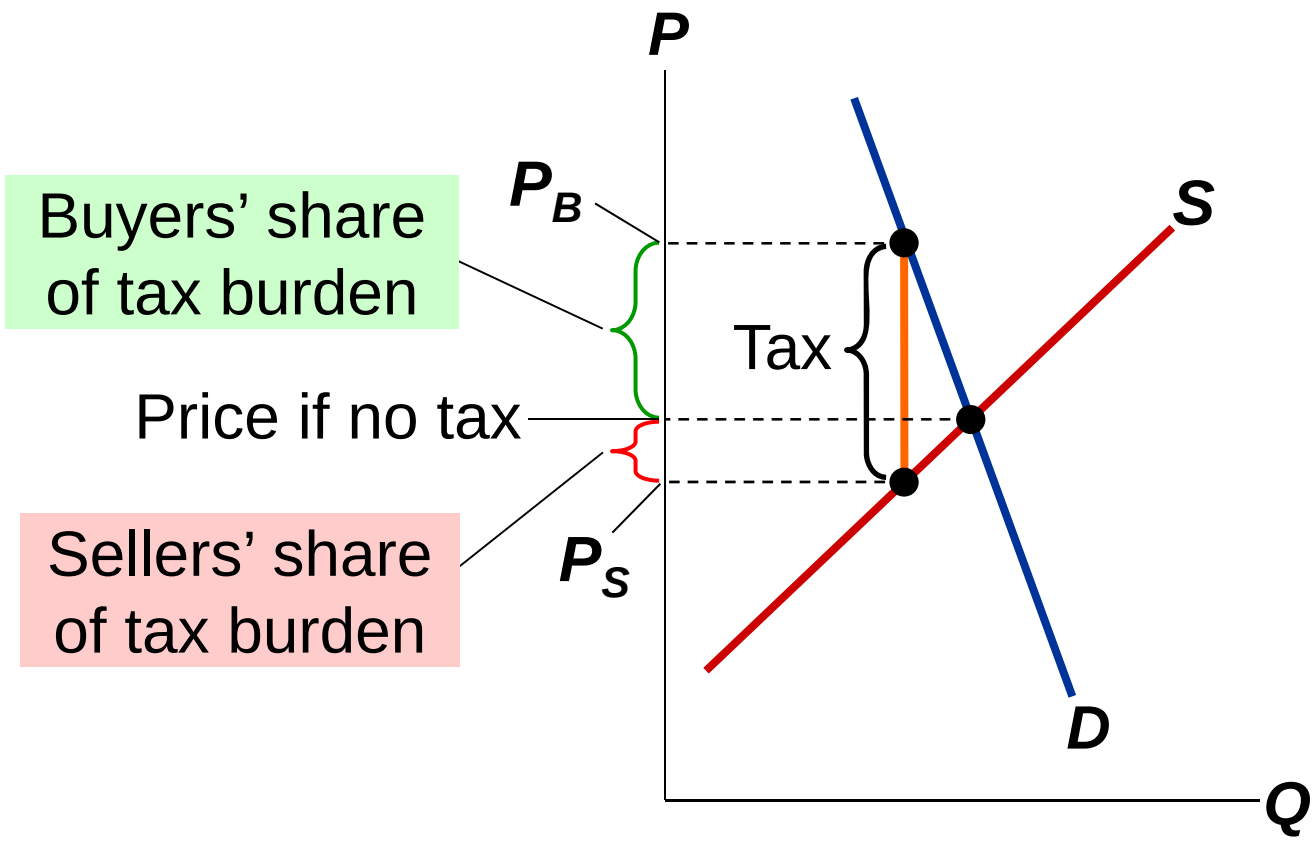
Elasticity and Tax Incidence

Putting demand and supply elasticity together

CASE 1: Supply is more elastic than demand.



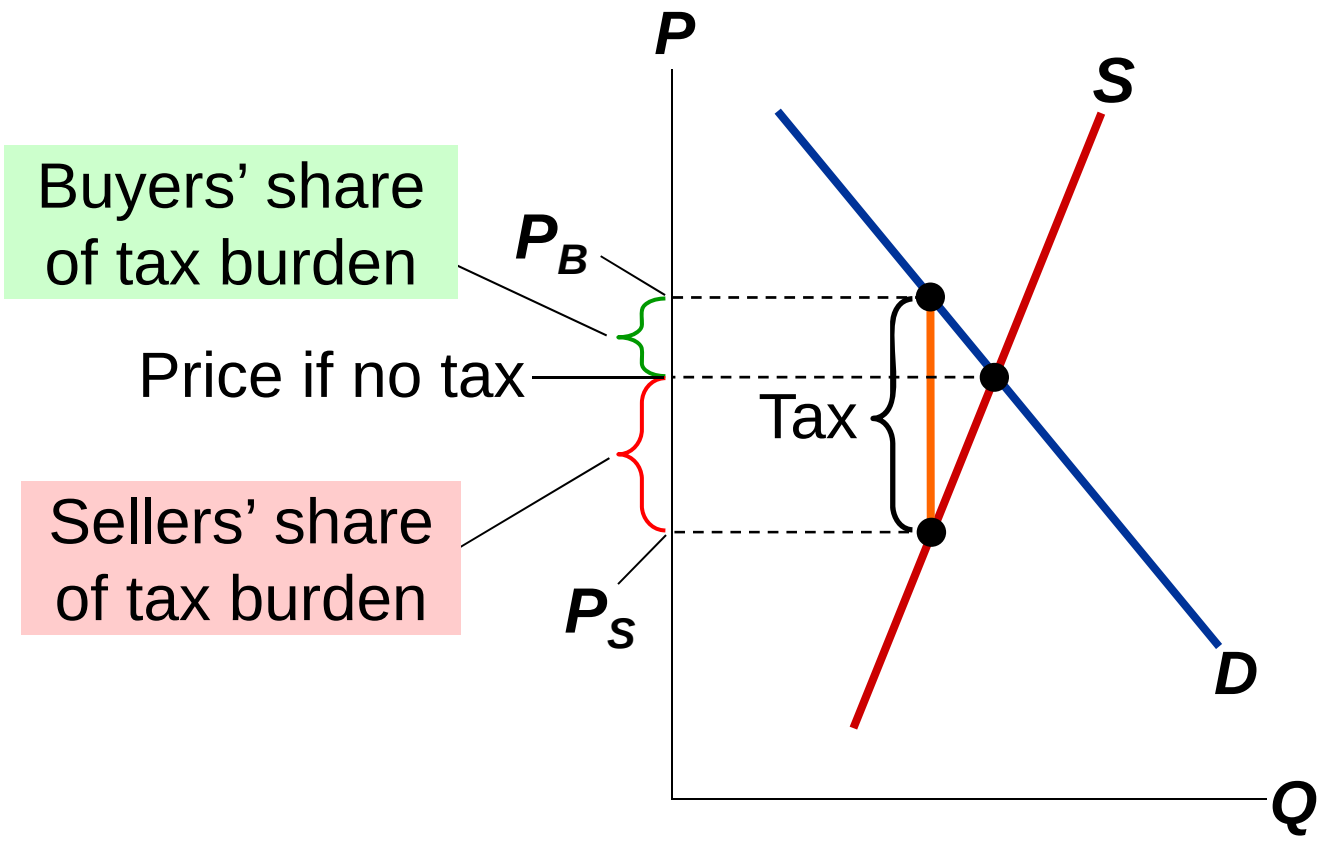
It's easier for sellers than buyers to leave the market.

So buyers bear most of the burden of the tax.

Elasticity and Tax Incidence

Putting demand and supply elasticity together

CASE 2: Demand is more elastic than supply.



It's easier for buyers than sellers to leave the market.

Sellers bear most of the burden of the tax.

Application: Who pays the luxury tax?

- 1990: Congress adopted a luxury tax on yachts, private airplanes, furs, expensive cars, etc.
- Goal: Raise revenue from those who could most easily afford to pay—wealthy consumers.
- **But who really pays this tax?**

Application: Who pays the luxury tax?

- What questions you may think of?
  - Tax on sellers or buyers matter?
  - Elasticity of demand and supply matter?
  - Which would have larger elasticity? Demand or Supply?

Application: Who pays the luxury tax?

The market for yachts

Application: 2011 payroll tax cut

- Prior to 2011, the Social Security payroll tax was 6.2% taken from workers' pay and 6.2% paid by employers (total 12.4%).
- The Tax Relief Act (2010) reduces the worker's portion from 6.2% to 4.2% (for 2011 only), but leaves the employer's portion at 6.2%.
- Question: Will the typical worker's take-home pay rise by exactly 2%, more than 2%, or less than 2%? Do elasticities affect your answer? Explain.

Application: 2011 payroll tax cut

Answer:

- Follow-up Question: Who gets the bigger share of this tax cut? How do elasticities determine the answer?

Application: 2011 payroll tax cut

Answer:

- **Think about extreme cases!**

DISCUSSION: TAXES AND EFFICIENCY

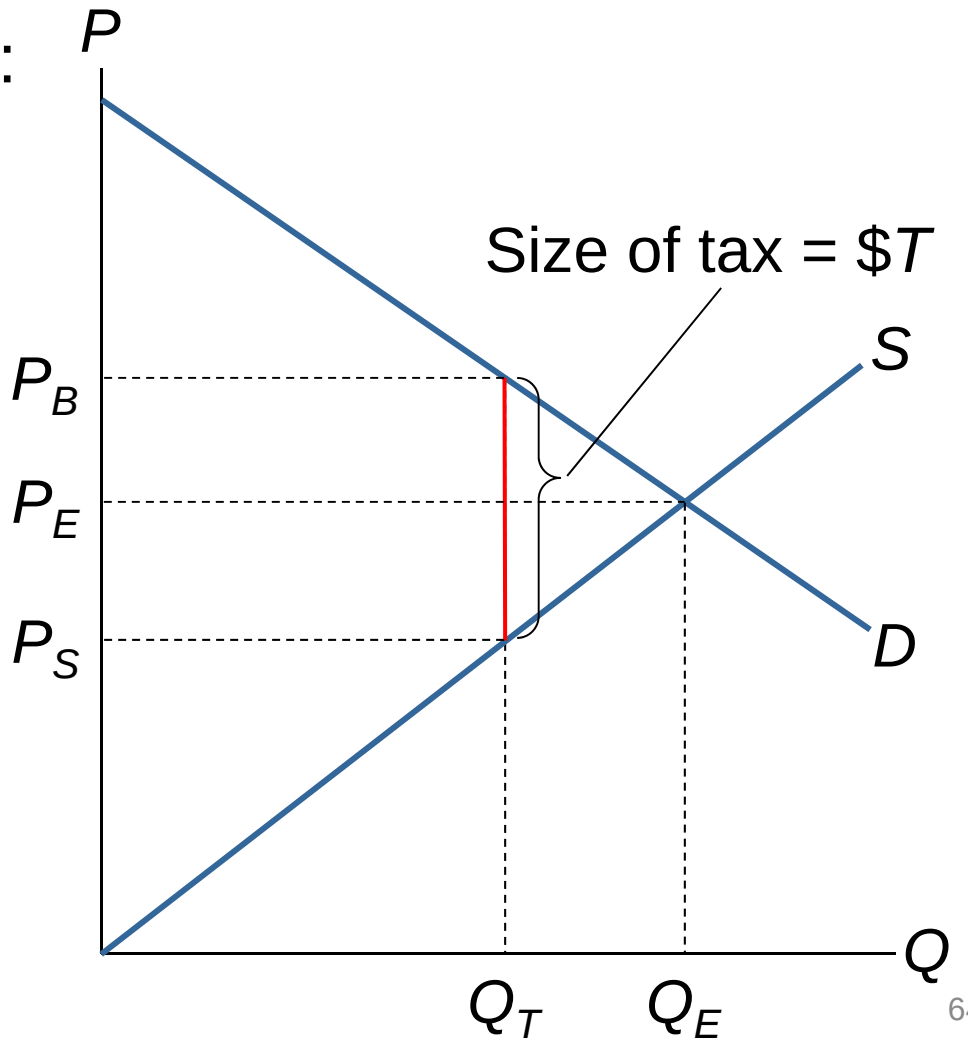
Summary: The Effects of a Tax

Equilibrium with no tax:

- Price = P_E
- Quantity = Q_E

Equilibrium with tax = $\$T$ per unit:

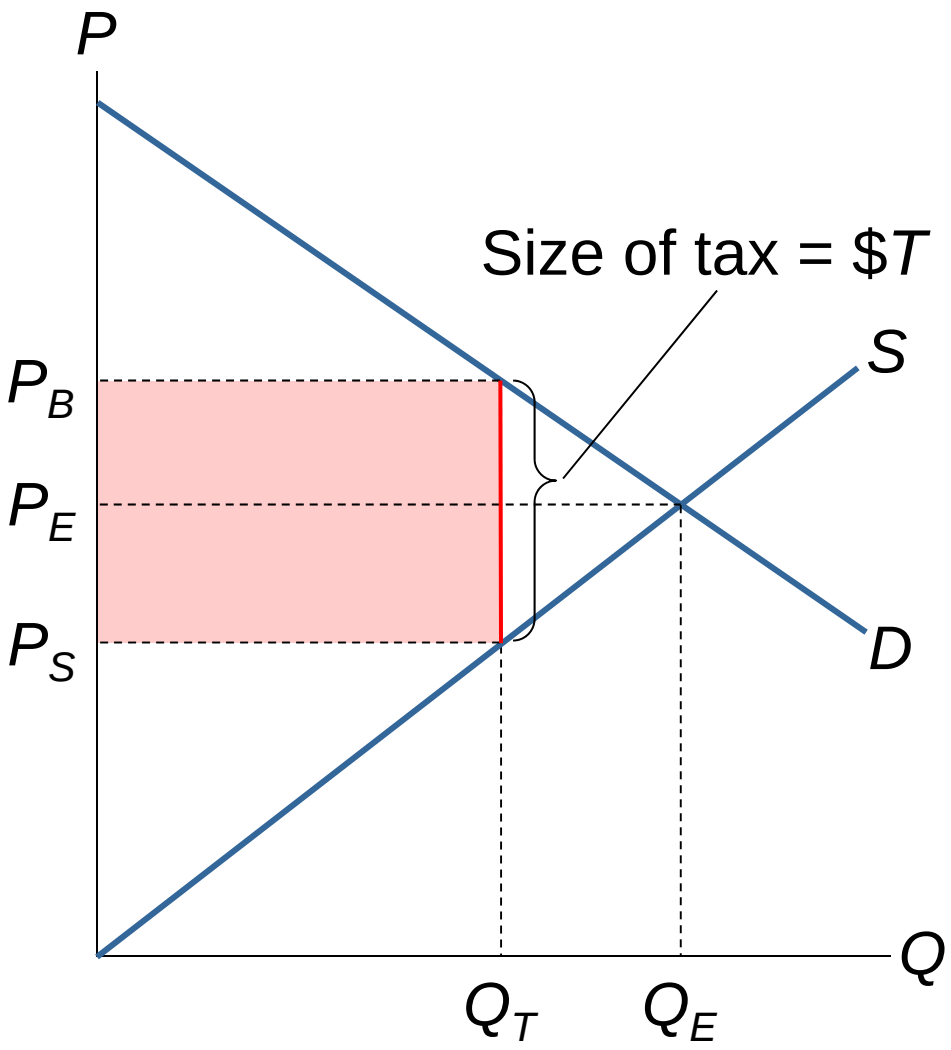
- Buyers pay P_B
- Sellers receive P_S
- Quantity = Q_T



Summary: The Effects of a Tax

Revenue from tax:

$\$T \times Q_T$



Summary: The Effects of a Tax

Next:

- We determine consumer surplus (CS), producer surplus (PS), tax revenue, and total surplus with and without the tax.
- Tax revenue can fund beneficial services (e.g., education, roads, police), so we include it in total surplus.

Summary: The Effects of a Tax

Without a tax,

CS = A + B + C

PS = D + E + F

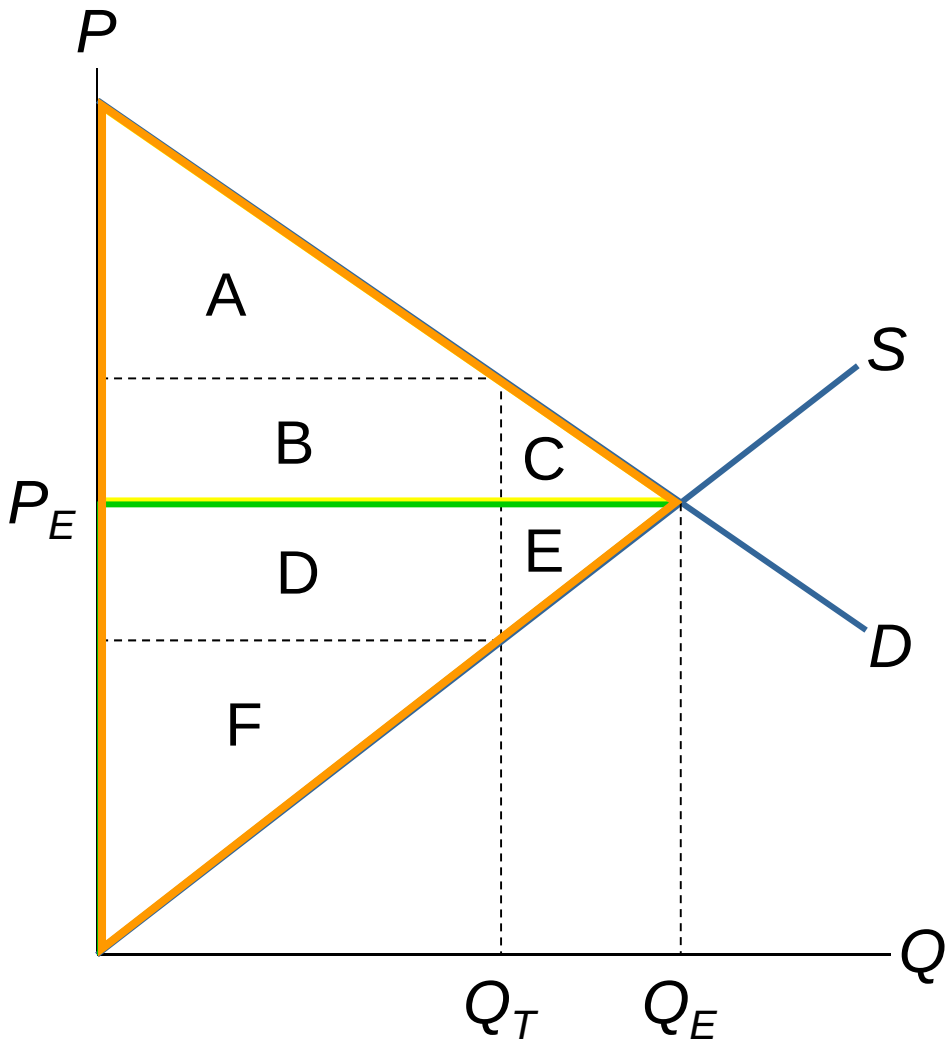
Tax revenue = 0

Total surplus

= CS + PS

= A + B + C

+ D + E + F



Summary: The Effects of a Tax

With the tax,

CS = A

PS = F

Tax revenue

= B + D

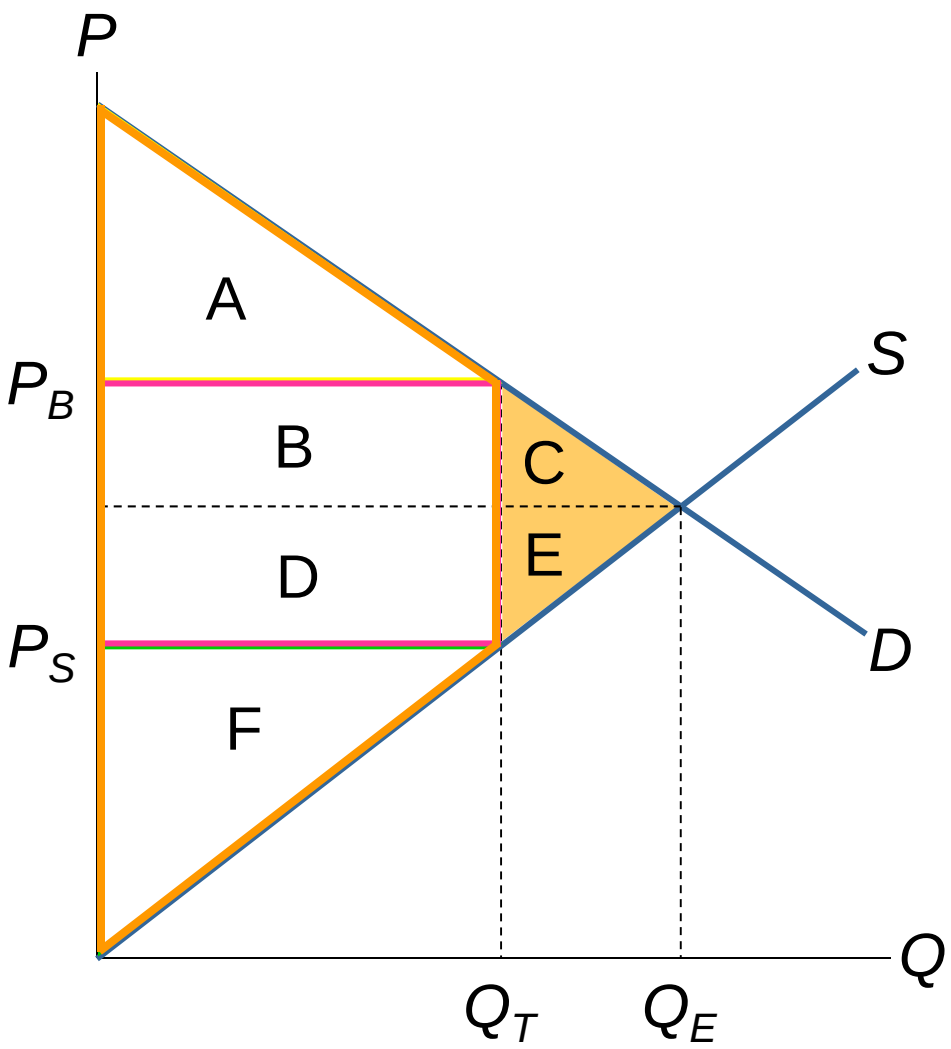
(Transfer from CS and PS)

Total surplus

= A + B + D + F

The tax reduces total surplus by

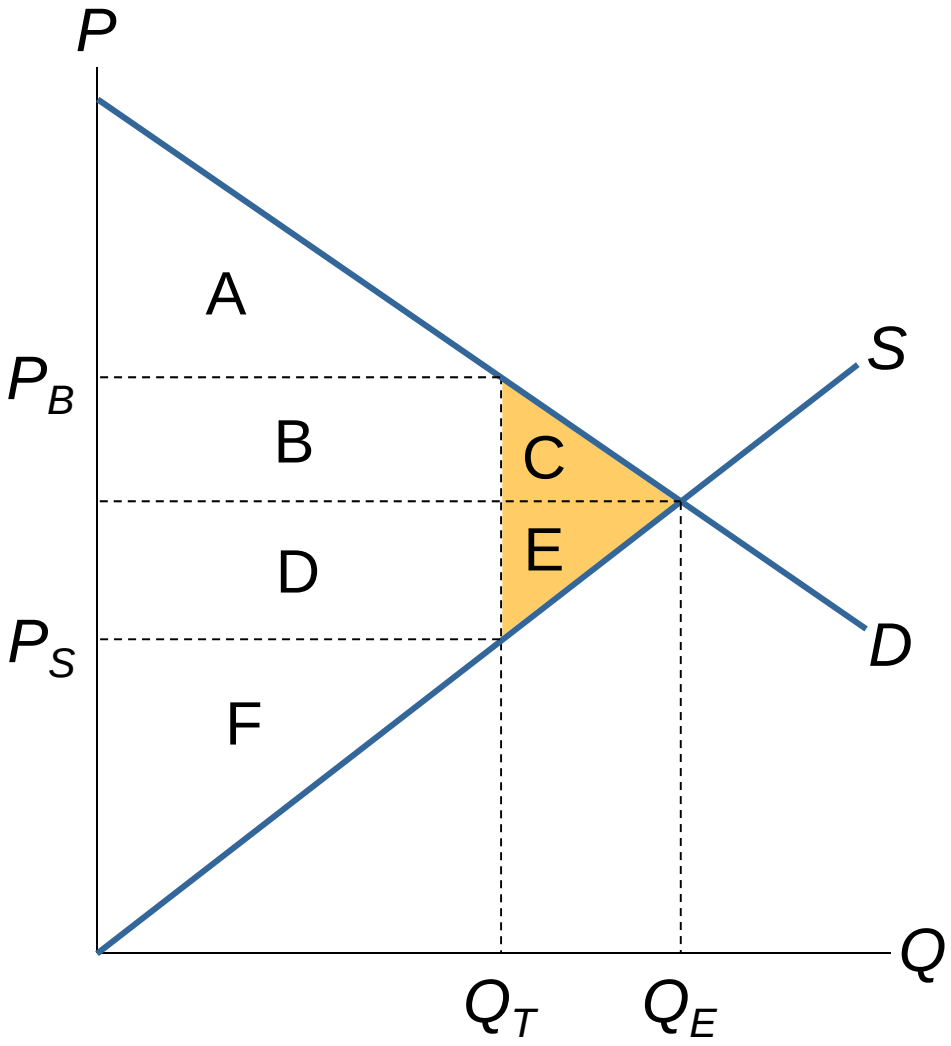
C + E



Summary: The Effects of a Tax

C + E: **deadweight loss** (DWL) of the tax

Fall in total surplus (certain mutually beneficial trade cannot happen) that results from a tax (or other measures that distort the functioning of perfect competitive market)



What determines the size of DWL

- DWL is a loss to the whole society
  - When imposing tax (unavoidable, for fund-raising purpose), “better” on items that with the smallest DWL.
- What determines the size of DWL?

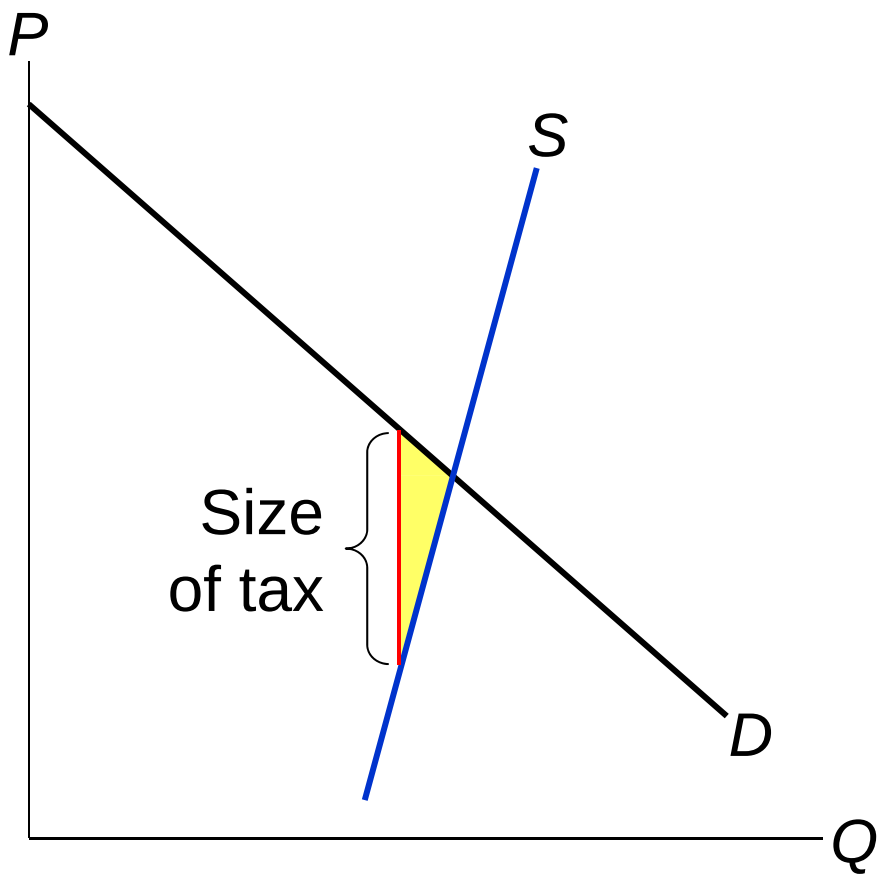
DWL and the Elasticity of Supply

When supply is inelastic,

it's harder for firms to leave the market when the tax reduces $\boldsymbol{P_S}$.

So, the tax only reduces ***Q*** a little,

and DWL is small.



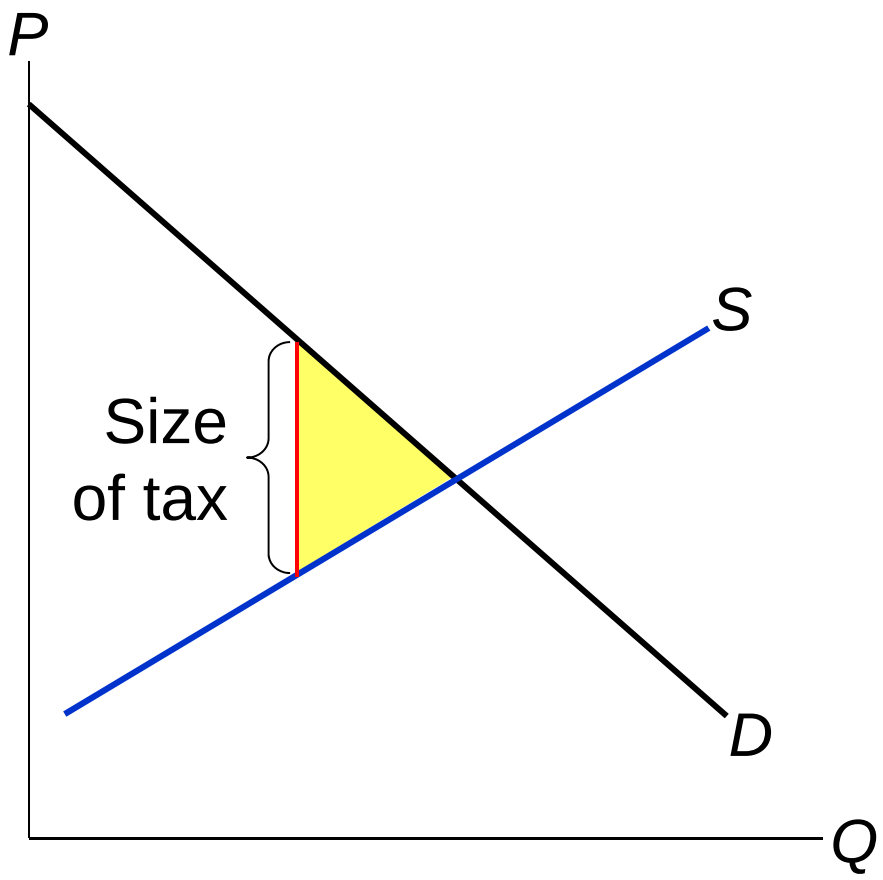
DWL and the Elasticity of Supply

The more elastic is supply,

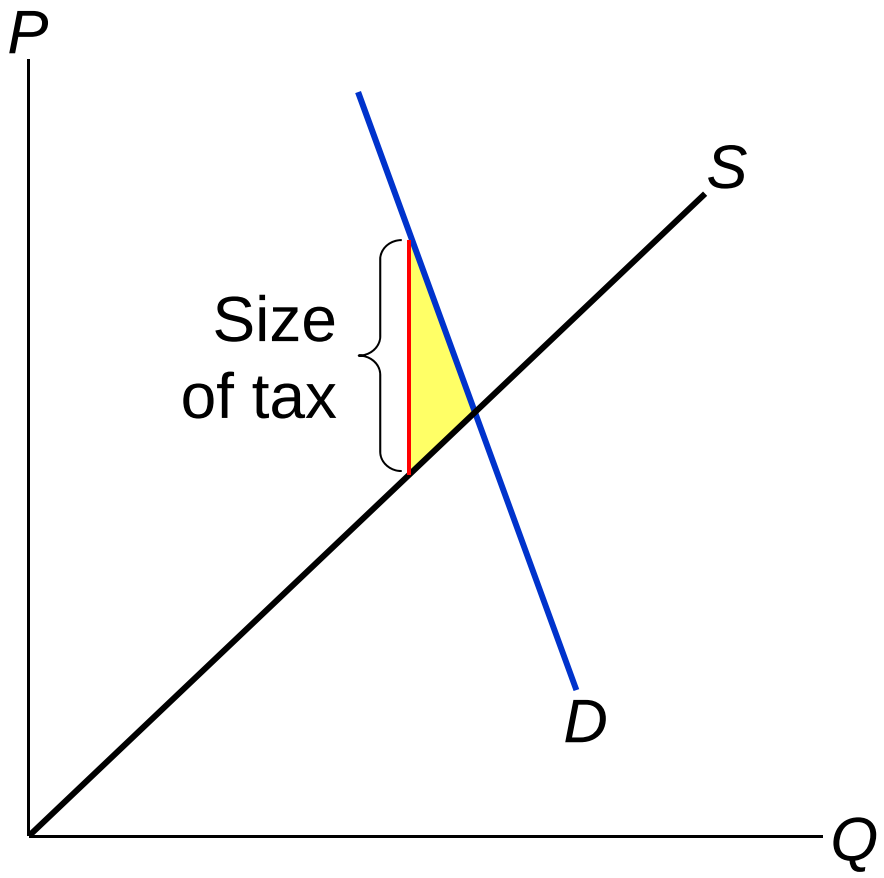
the easier for firms to leave the market when the tax reduces P_S,

the greater Q falls below the surplus-maximizing quantity,

the greater the DWL.



DWL and the Elasticity of Demand



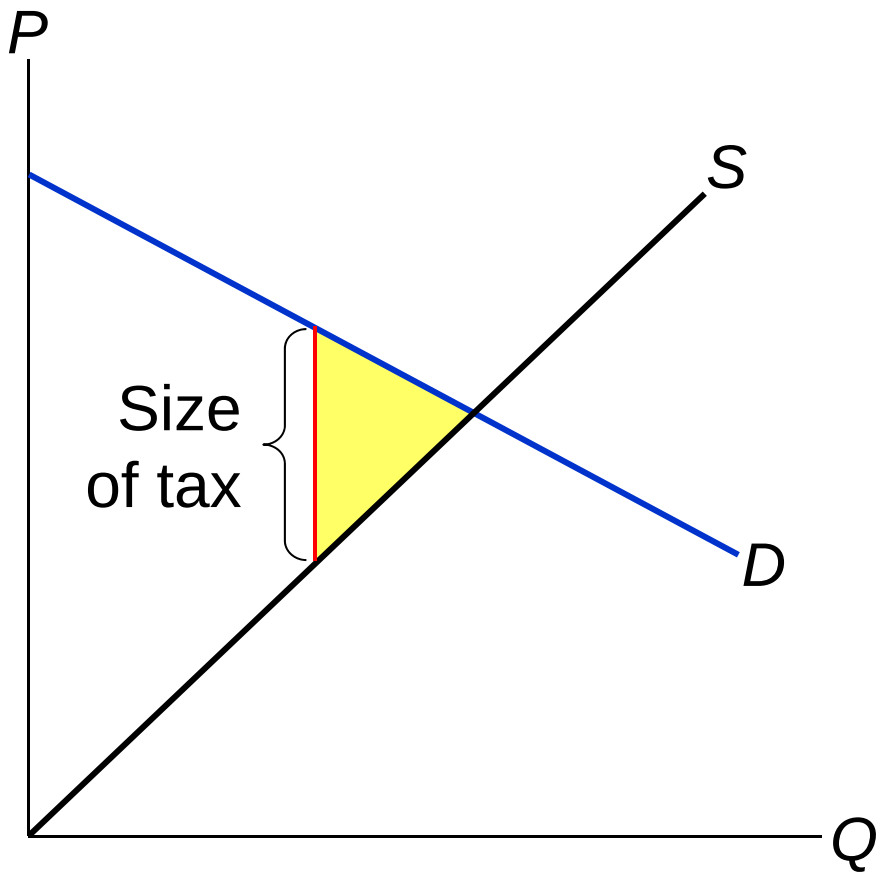
When demand is inelastic,

it's harder for consumers to leave the market when the tax raises P_B.

So, the tax only reduces Q a little,

and DWL is small.

DWL and the Elasticity of Demand



The more elastic is demand,

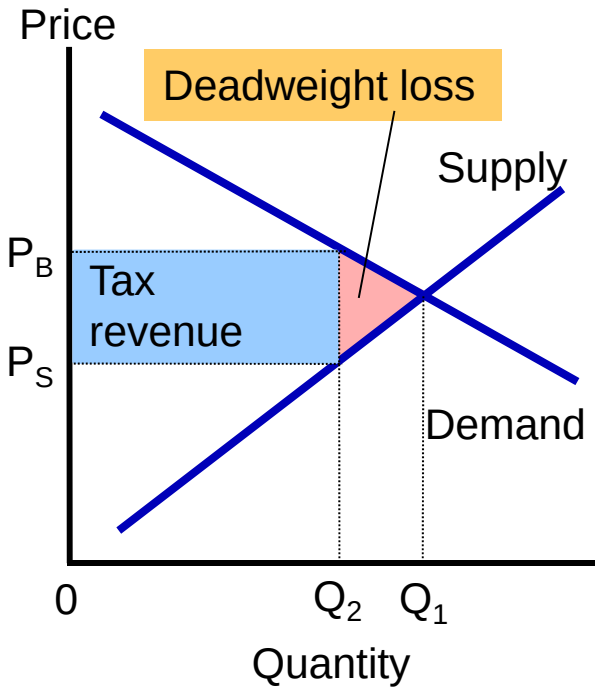
the easier for buyers to leave the market when the tax increases P_B,

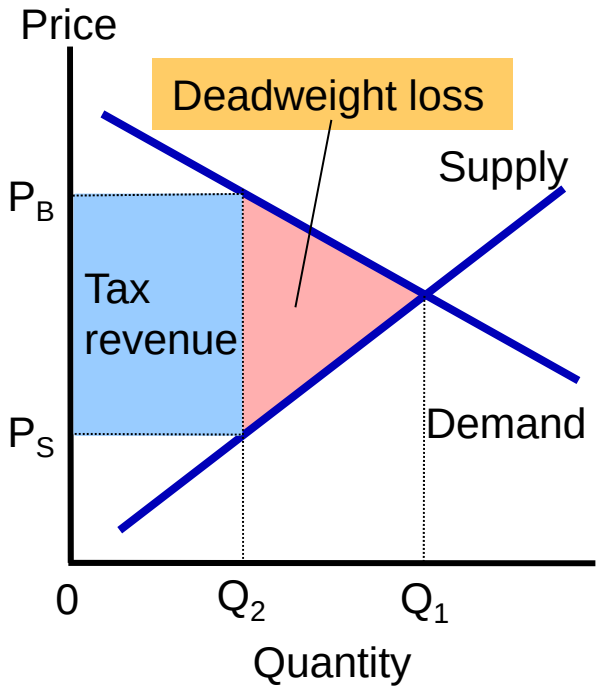
the more Q falls below the surplus-maximizing quantity,

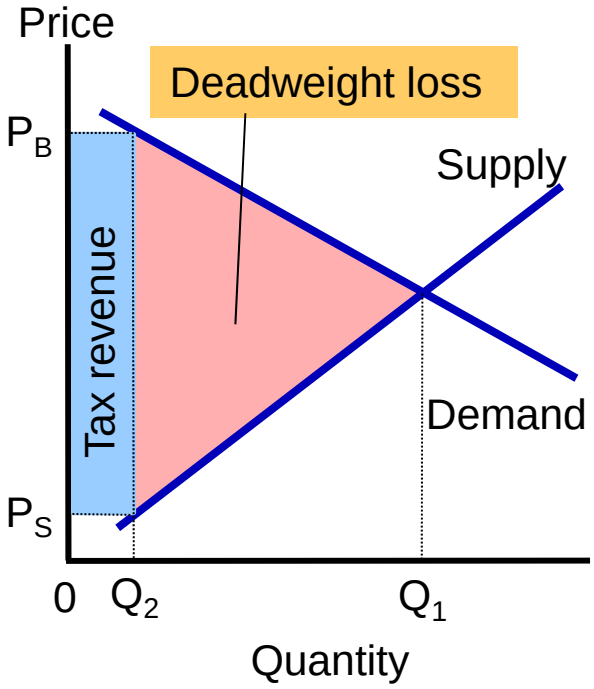
and the greater the DWL.

Larger tax brings more tax revenue?

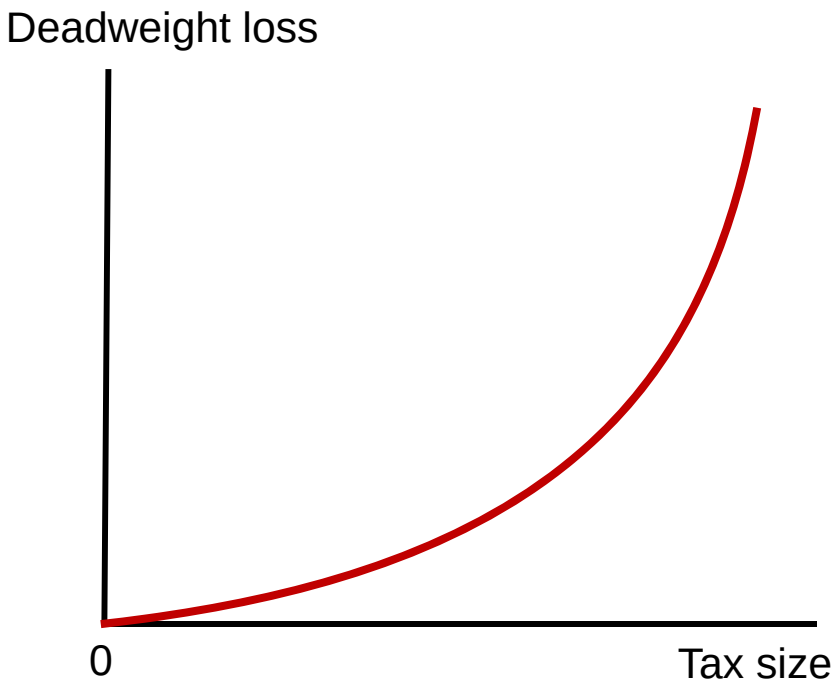
- Not necessarily!

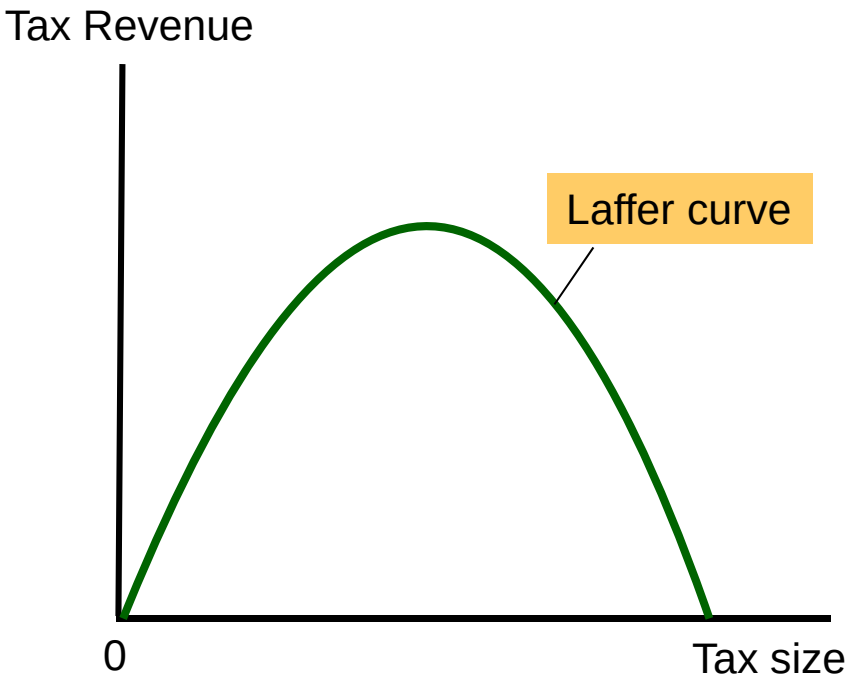






Larger tax brings more tax revenue?





Taxes and Fairness

- Two conflicting principles of fairness to apply to a tax system:
  - The benefits principle
  - The ability-to-pay principle

The Benefit Principle

- The benefits principle is the proposition that people should pay taxes equal to the benefits they receive from the services provided by government.
- This arrangement is fair because it means that those who benefit most pay the most taxes.
  - No redistribution

The Ability-to-Pay Principle

- The ability-to-pay principle is the proposition that people should pay taxes according to how easily they can bear the burden of the tax.
  - A rich person can more easily bear the burden than a poor person can.
  - Redistribution
- So the ability-to-pay principle can reinforce the benefits principle to justify high rates of income tax on high incomes.

Thank you very much

End for today ☺

See you next time !