

Principles of Economics

Chapter 6:

Supply, Demand, and Government Policies



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Price Control and Taxation

Joseph Tao-yi Wang

In This Chapter

- ▶ What are **price ceilings** and **price floors**?
 - ▶ What are some examples of each?
 - ▶ How do price ceilings and price floors affect market outcomes?
- ▶ How do **taxes** affect market outcomes?
 - ▶ How do the effects depend on whether the tax is imposed on buyers or sellers?
- ▶ What is the **incidence** of a tax?
 - ▶ What determines the incidence?

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Government Policies

- ▶ Economists as Policy Advisers
 - ▶ Use theories to help change the world for the better.
- ▶ Policies
 - ▶ Often have effects that their architects did not intend or anticipate
 - ▶ Alter the private market outcome
 1. Price Controls
 2. Taxes

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Controls on Prices

- ▶ **Price Ceiling:**
 - ▶ Legal maximum on the price at which a good can be sold
 - ▶ Example: Rent-control laws
- ▶ **Price Floor:**
 - ▶ Legal minimum on the price at which a good can be sold
 - ▶ Example: Minimum wage laws

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Ask The Experts

Rent Control

“Local ordinances that limit rent increases for some rental housing units, such as in New York and San Francisco, have had a positive impact over the past three decades on the amount and quality of broadly affordable rental housing in cities that have used them.”

▶ Do you Agree or Disagree?

▶ Do you think Economists Agree or Disagree?

Source: IGM Economic Experts Panel, February 7, 2012.

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Do you "Agree" or "Disagree"?

“Local ordinances that limit rent increases for some rental housing units, such as in New York and San Francisco, have had a positive impact over the past three decades on the amount and quality of broadly affordable rental housing in cities that have used them.”

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Do Economists "Agree" or "Disagree"?

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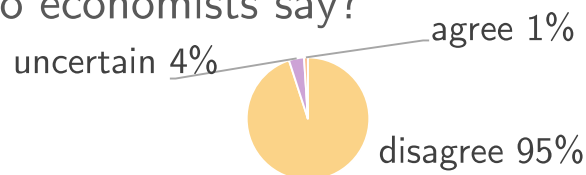
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Ask The Experts

Rent Control

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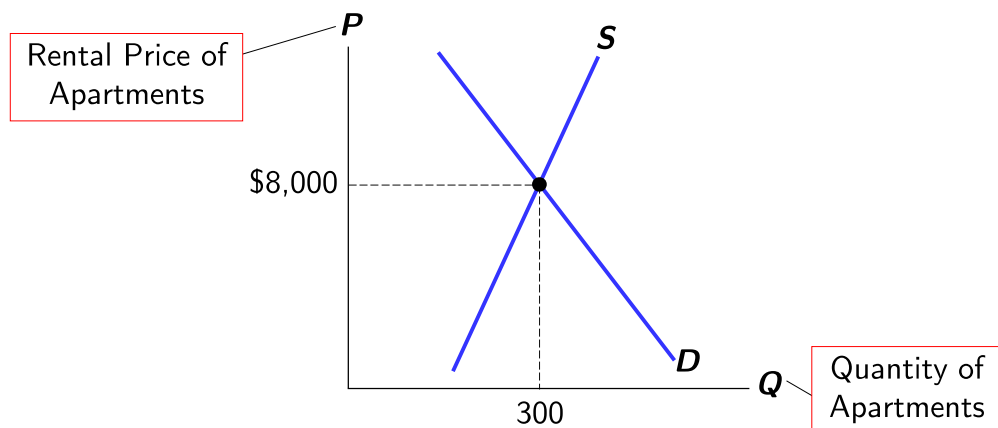
What do economists say?



Source: IGM Economic Experts Panel, February 7, 2012.

Example 1: The Market for Apartments

▶ Equilibrium Without Price Controls



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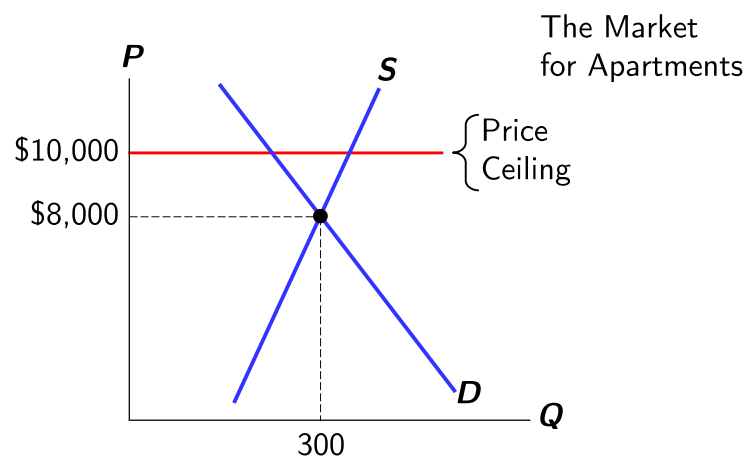
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Example 1A: Non-Binding Price Ceiling

- ▶ A price ceiling above the equilibrium price is **not binding**
- ▶ has no effect on the market outcome.

▶ $P = \text{NT}\$8,000$

▶ $Q = 300$



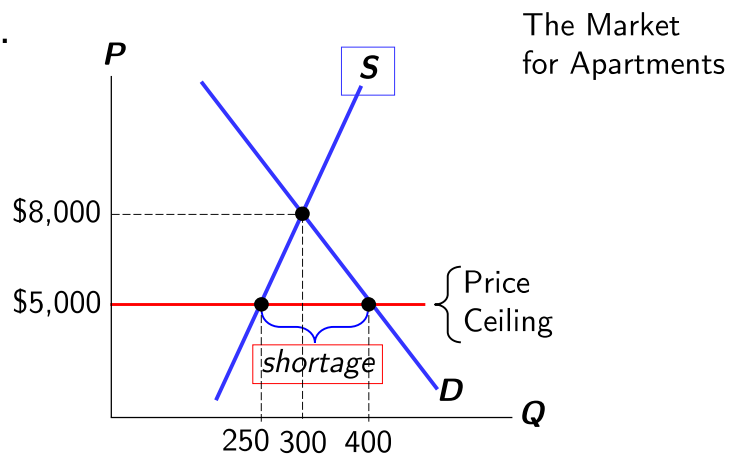
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Example 1B: Binding Price Ceiling

- ▶ The equilibrium price (NT\$8,000) is **above** the ceiling and therefore illegal.
- ▶ The price ceiling is **binding**, causes a **shortage**.
- ▶ $P = \text{NT\$}5,000$
- ▶ $Q^d = 400$
- ▶ $Q^s = 250$



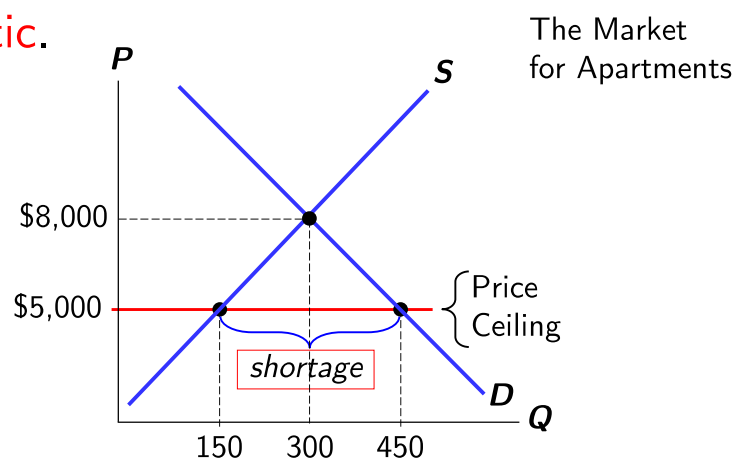
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Example 1C: Binding Price Ceiling in Long Run

- ▶ In the long run, supply and demand of rental apartments are **more price-elastic**.
- ▶ So, the shortage is larger.



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Shortages and Rationing

- ▶ Because of Shortage
 - ▶ Sellers must ration the goods among buyers
- ▶ Some rationing mechanisms:
 - ▶ Long lines
 - ▶ Discrimination according to sellers' biases
 - ▶ Are often unfair and inefficient
 - ▶ The goods do not necessarily go to the buyers who value them most highly

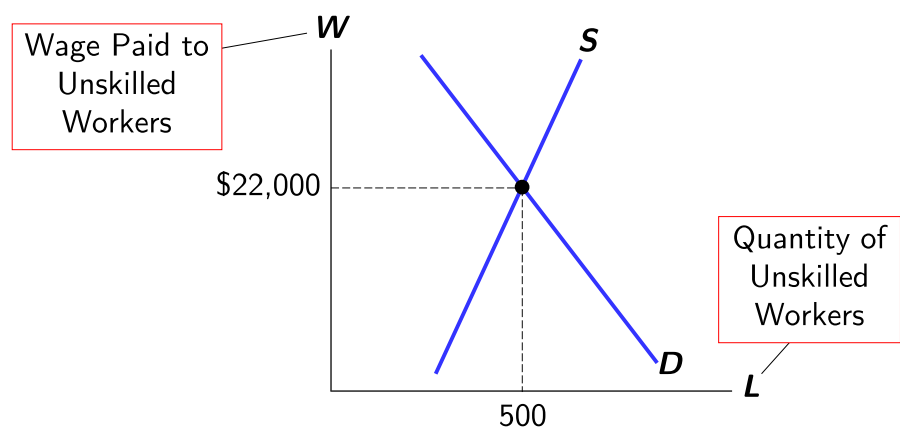
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Example 2: The Market for Unskilled Labor

- ▶ Equilibrium **Without** Price Controls



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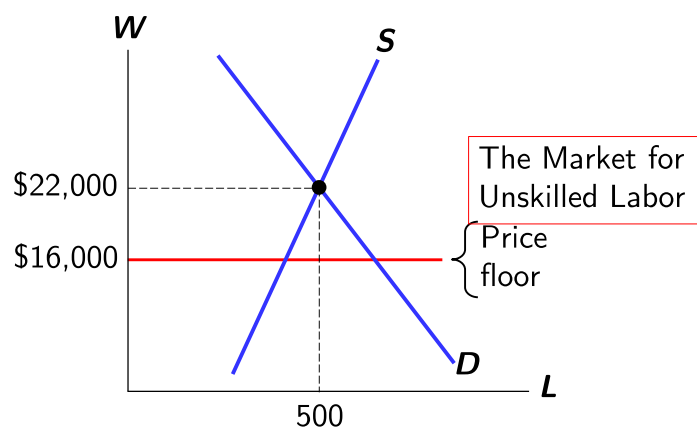
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Example 2A: Not Binding Price Floor

- ▶ A price floor below the equilibrium price is **not binding**
- ▶ has no effect on the market outcome.

- ▶ $W = \text{NT\$}22,000$
- ▶ $Q = 500$



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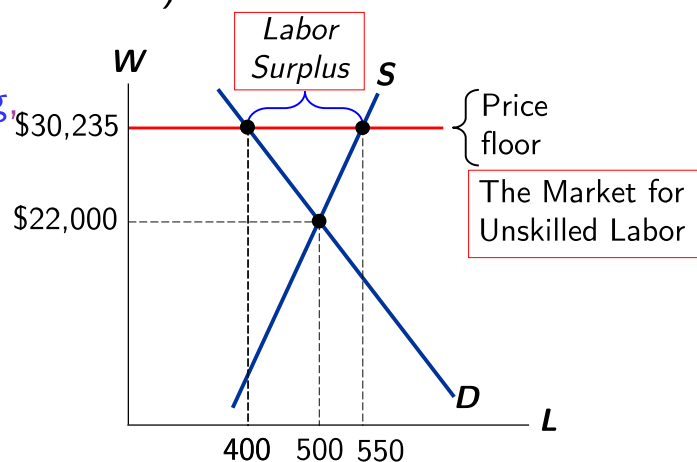
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Example 2B: Binding Price Floor

- ▶ The equilibrium wage (NT\$22k) is **below** the floor and therefore illegal.
- ▶ The price floor is **binding**, causes a surplus (i.e., unemployment).

- ▶ $W = \text{NT\$}30,235$
- ▶ $Q^d = 400$
- ▶ $Q^s = 550$



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Ask The Experts

The Minimum Wage

- ▶ “If the federal minimum wage is raised gradually to \$15-per-hour by 2020, the employment rate for low-wage U.S. workers will be substantially lower than it would be under the status quo.”

▶ Do you Agree or Disagree?

▶ Do you think Economists Agree or Disagree?

Source: IGM Economic Experts Panel, February 7, 2012.

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Do you "Agree" or "Disagree"?

“If the federal minimum wage is raised gradually to \$15-per-hour by 2020, the employment rate for low-wage U.S. workers will be substantially lower than it would be under the status quo.”

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Do Economists "Agree" or "Disagree"?

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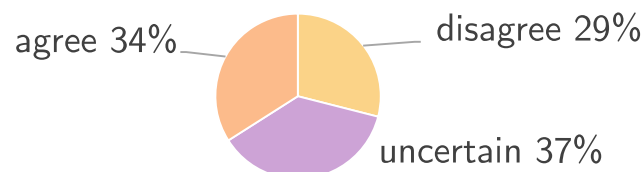
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Ask The Experts

The Minimum Wage

- ▶ “If the federal minimum wage is raised gradually to \$15-per-hour by 2020, the employment rate for low-wage U.S. workers will be substantially lower than it would be under the status quo.”

What do economists say?



Source: IGM Economic Experts Panel, February 7, 2012.

Minimum Wage Laws

- ▶ The minimum wage has its greatest impact on the market for teenage labor.
 - ▶ Least skilled and least experienced
 - ▶ Willing to accept a lower wage in exchange for on-the-job training
 - ▶ 10% minimum wage hike drops 1-3% teenage employment
 - ▶ Focus on the effects in short-run
 - ▶ Long-Run Effects: Harder to estimate, but more relevant and likely larger

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Minimum Wage Laws

- ▶ Long-Run Effects:
 - ▶ Increase in quantity supplied of labor
 - ▶ Higher number of teenagers who choose to look for jobs
- ▶ Advocates of the Minimum Wage
 - ▶ One way to raise the income of working poor
 - ▶ Workers who earn the minimum wage can afford only a meager standard of living

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Minimum Wage Laws

- ▶ Opponents of the Minimum Wage:
 - ▶ Not the best way to combat poverty
 1. Causes unemployment,
 2. Encourages teenagers to drop out of school,
 3. Prevents some unskilled workers from getting on-the-job training

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Minimum Wage Laws

- ▶ Minimum-Wage Workers
 - ▶ Less than a third of minimum-wage earners are in families with incomes below the poverty line
 - ▶ Many are teenagers from middle-class homes working at part-time jobs for extra spending money

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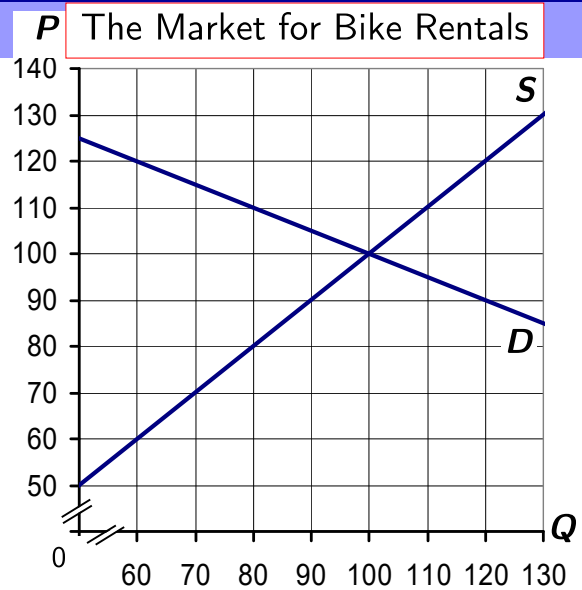
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Active Learning 1:

Price Controls

- ▶ In the graph, the market for bike rentals is in equilibrium.
- ▶ Determine the effects of:
 - ▶ \$90 price ceiling
 - ▶ \$90 price floor
 - ▶ \$120 price floor



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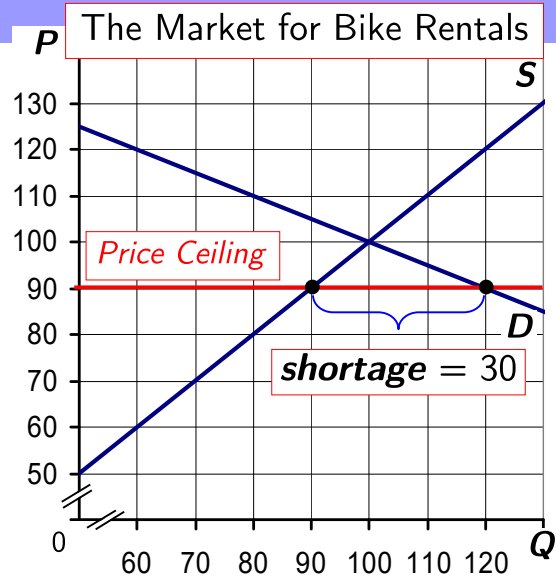
In the graph, the market for bike rentals is in equilibrium. Determine the effects of a \$90 price ceiling.

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Active Learning 1A:

NT\$90 Price Ceiling

- ▶ The price falls to NT\$90.
- ▶ (binding price ceiling below the equilibrium)
- ▶ Buyers demand 120 bike rentals, sellers supply 90,
- ▶ Leaving a shortage of
- ▶ $120 - 90 = 30$ bike rentals.



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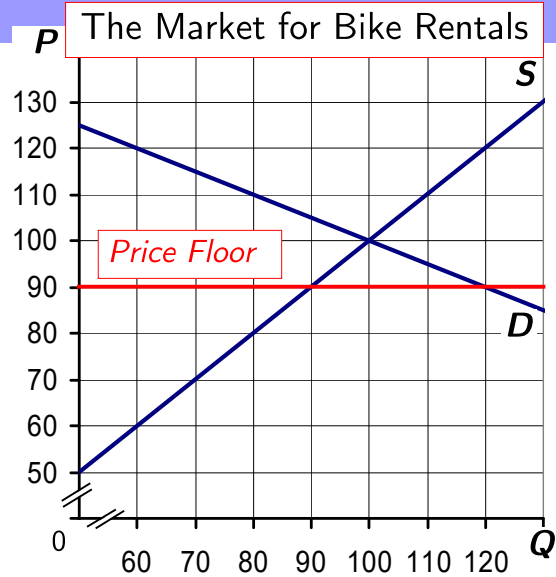
In the graph, the market for bike rentals is in equilibrium. Determine the effects of a \$90 price floor.

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Active Learning 1B:

NT\$90 Price Floor

- ▶ Equilibrium price is above the NT\$90 price floor,
- ▶ So the price floor is not binding.
- ▶ $P = \text{NT\$}100$,
- ▶ $Q = 100$ bike rentals



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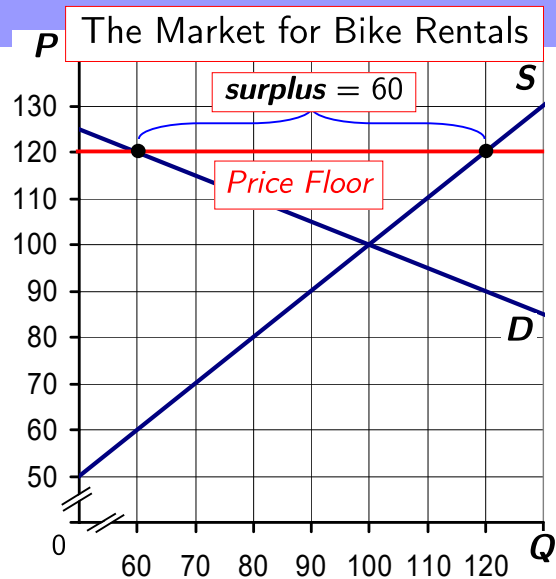
In the graph, the market for bike rentals is in equilibrium. Determine the effects of a \$120 price floor.

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Active Learning 1C:

NT\$120 Price Floor

- ▶ The price rises to NT\$120
- ▶ (binding price floor above the equilibrium)
- ▶ Buyers demand 60 bike rentals, sellers supply 120
- ▶ Causing a surplus of $120 - 60 = 60$ bike rentals.



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Evaluating Price Controls

- ▶ Markets are usually a good way to organize economic activity
 - ▶ Economists usually oppose price ceilings and price floors
 - ▶ Prices are not the outcome of some haphazard process
 - ▶ Prices have the crucial job of balancing supply and demand
 - ▶ Coordinating economic activity

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Evaluating Price Controls

- ▶ Governments can sometimes improve market outcomes
 - ▶ Want to use price controls
 - ▶ Because of unfair market outcome
 - ▶ Aimed at helping the poor
 - ▶ Often hurt those they are trying to help
 - ▶ Other ways of helping those in need
 - ▶ Rent subsidies
 - ▶ Wage subsidies (Earned Income Tax Credit)

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Taxes

- ▶ Government Uses Taxes
 - ▶ To raise revenue for public projects
 - ▶ Roads, schools, and national defense
- ▶ Tax Incidence
 - ▶ Manner in which the burden of a tax is shared among participants in a market
 - ▶ The government can make the seller or the buyer to pay the tax

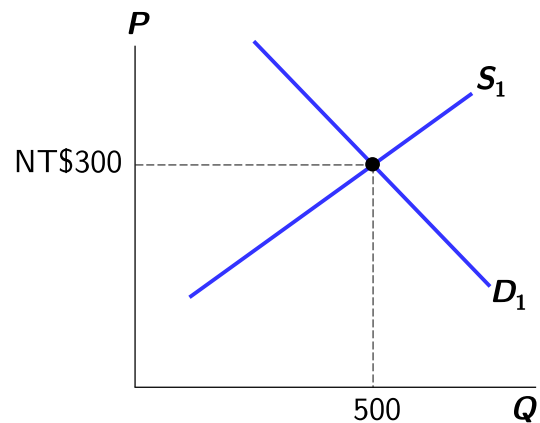
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Example 3: The Market for Pizza

► Equilibrium Without Tax



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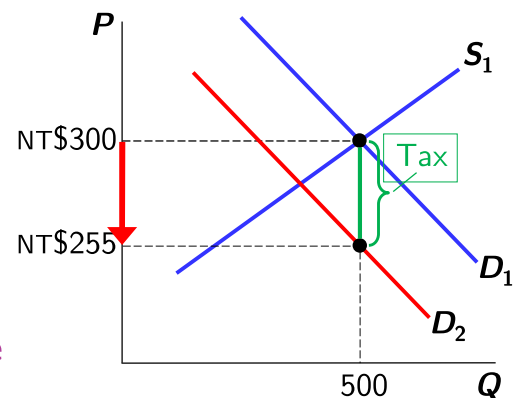
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Example 3A: An NT\$45 Tax Imposed on Buyers

- Hence, a tax on buyers shifts the D curve down by the amount of the tax.
- The price buyers pay is now NT\$45 higher than the market price P .
- P would have to fall by NT\$45 to make buyers willing to buy same Q as before.
- E.g., if P falls from NT\$300 to NT\$255, buyers are willing to purchase 500 pizzas.

Effects of a NT\$45 per unit
Tax on Buyers



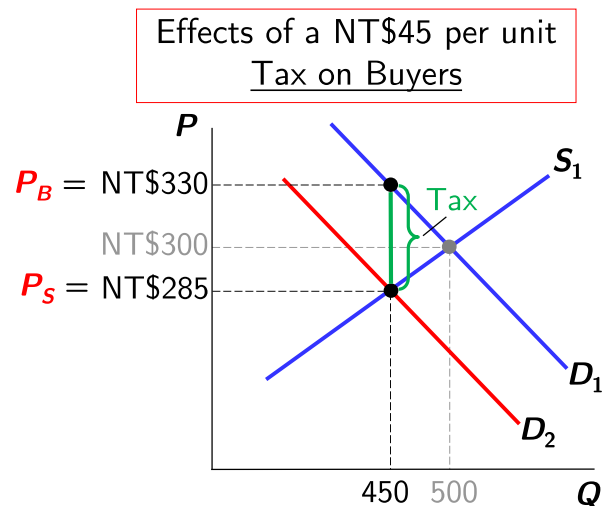
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Example 3B: The New Equilibrium

- ▶ New Equilibrium:
 - ▶ $Q = 450$
 - ▶ Sellers receive $P_S = \text{NT\$}285$
 - ▶ Buyers pay $P_B = \text{NT\$}330$
- ▶ Difference between them
 - $= P_B - P_S = \text{NT\$}45$
 - $= \text{tax}$



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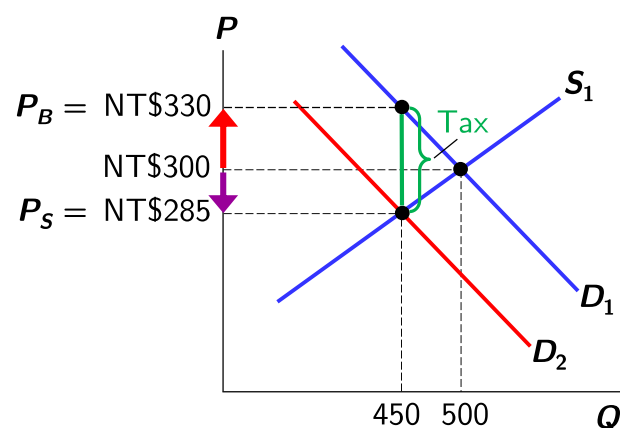
Example 3C: The Incidence of a Tax on Buyers

- ▶ **Tax Incidence:** how the burden of a tax is shared among market participants

In our example,

Buyers pay
NT\$30 more,

Sellers get
NT\$15 less.



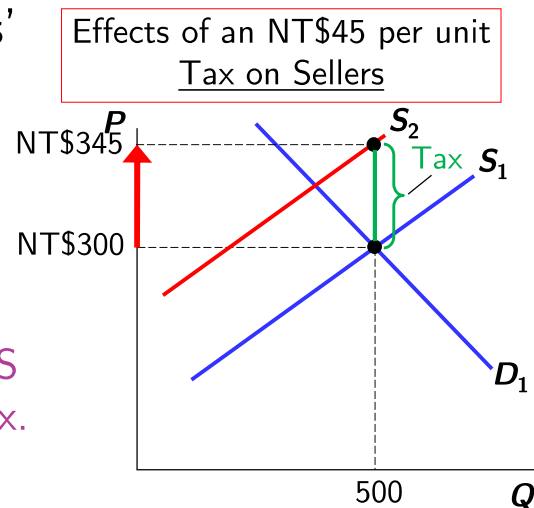
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Example 4A: An NT\$45 Tax Imposed on Sellers

- ▶ The tax effectively raises sellers' costs by NT\$45 per pizza.
- ▶ Sellers will supply 500 pizzas only if P rises to NT\$345, to compensate for this cost increase.
- ▶ Hence, a tax on sellers shifts the S curve up by the amount of the tax.



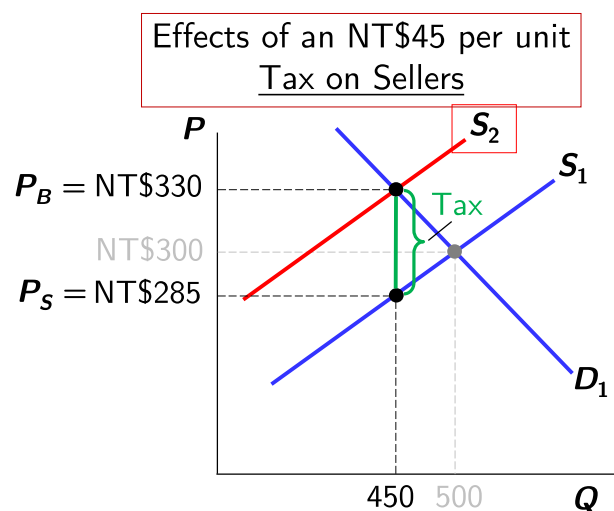
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Example 4B: The New Equilibrium

- ▶ New Equilibrium:
 - ▶ $Q = 450$
 - ▶ Buyers pay $P_B = \text{NT\$}330$
 - ▶ Sellers receive $P_S = \text{NT\$}285$
- ▶ Difference between them = $\text{NT\$}45 = \text{tax}$



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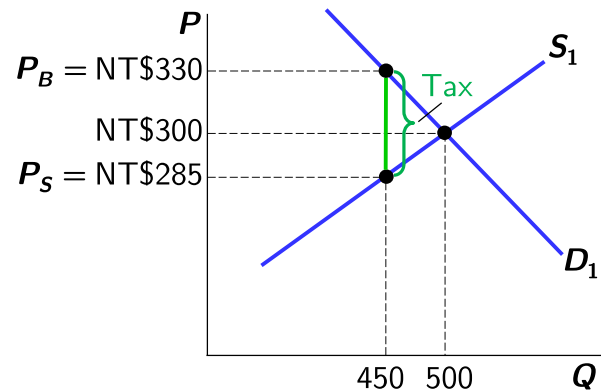
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The Outcome is The Same in Both Cases!

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

- ▶ A tax drives a wedge between the price buyers pay and the price sellers receive.



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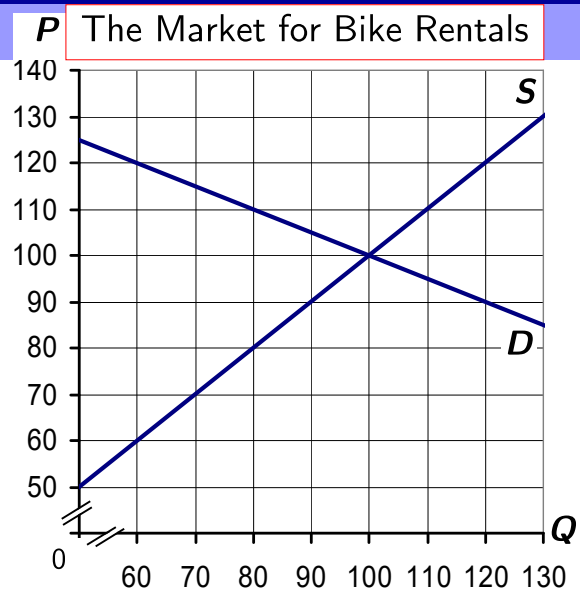
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Active Learning 2:

Effects of a Tax

- ▶ In the graph, the market for bike rentals is in equilibrium, but now the government imposes a tax on buyers of \$30 per bike rental.
- ▶ Find the new Q , P_B , P_S , and incidence of tax.



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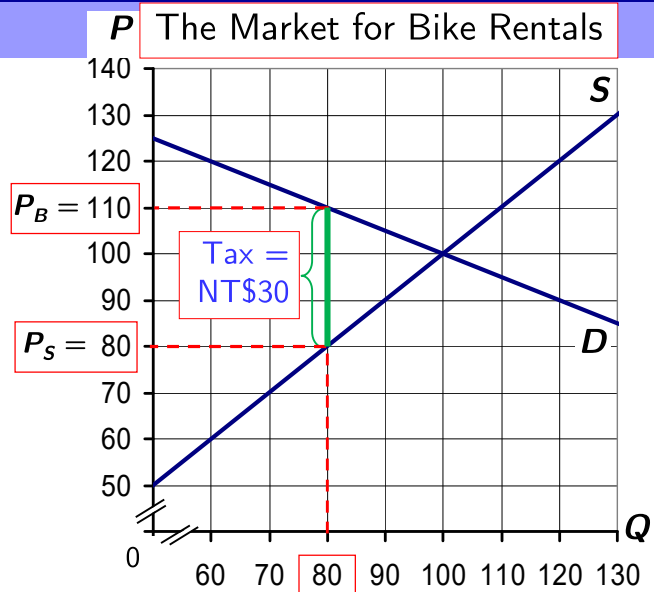
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Active Learning 2: Answers

- ▶ $Q = 80$
- ▶ $P_B = \text{NT\$}110$
- ▶ $P_S = \text{NT\$}80$

- ▶ Incidence
 - ▶ Buyers: NT\$10
 - ▶ Sellers: NT\$20



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Elasticity and Tax Incidence

- ▶ When a good is taxed
 - ▶ Buyers and sellers of the good share the burden of the tax
 - ▶ But how exactly is the tax burden divided?
 - ▶ Depends on the elasticity of demand and elasticity of supply

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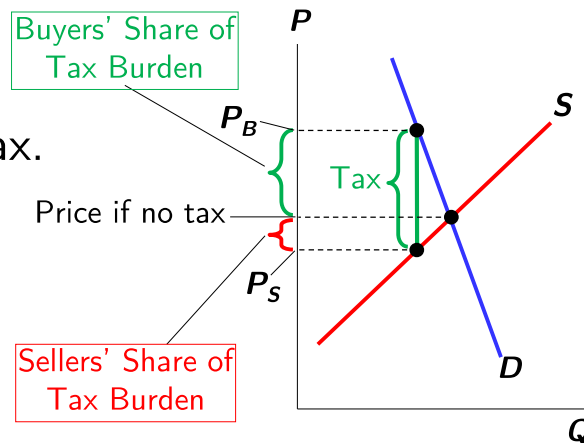
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Case 1: Elastic Supply, Inelastic Demand

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

- ▶ So buyers bear most of the burden of the tax.



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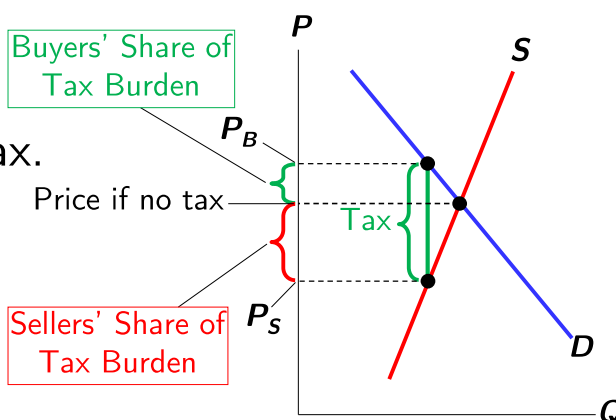
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Case 2: Inelastic Supply, Elastic Demand

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

- ▶ Sellers bear most of the burden of the tax.



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Who Pays the Cigarette Tax?

- ▶ 2017, Taiwan's Legislative Yuan increased the cigarette tax by NT\$20.
- ▶ Goal: to raise revenue from those "evil" and wealthy cigarette companies
- ▶ Addictive goods
 - ▶ Demand is quite inelastic
 - ▶ Supply is relatively elastic

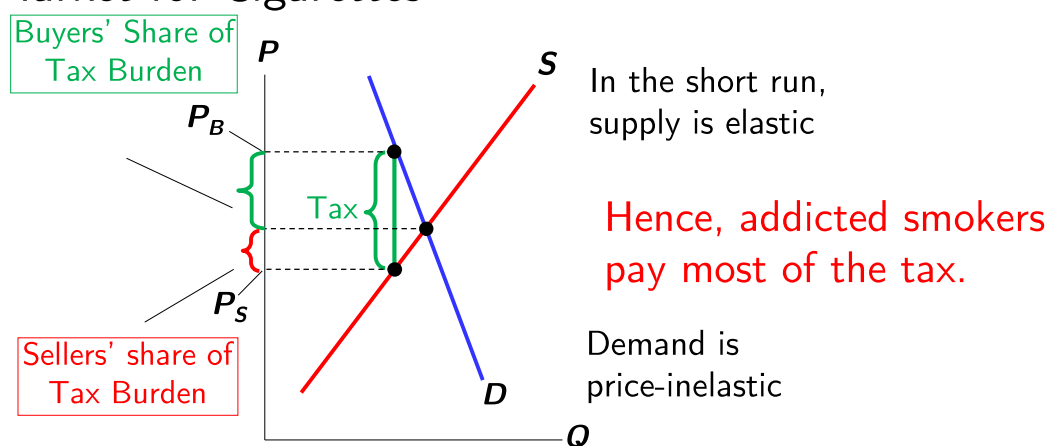
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Case Study: Who Pays the Cigarette Tax?

▶ The Market for Cigarettes



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Think-Pair-Share

- ▶ Suppose that Taiwan needs to raise more tax revenue.
 - ▶ Premier Su proposes a tax on food because everyone must eat and, thus, a food tax would surely raise a great deal of tax revenue. He insists the tax should be placed on food sellers to protect the poor who spend a large proportion of their income on food.
- ▶ Will the burden of a food tax fall only on the sellers of food as the Premier said? Explain.
- ▶ Who will bear most of this tax burden? Explain.

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Chapter In A Nutshell

- ▶ A price ceiling is a legal maximum on the price of a good or service. Example: rent control.
 - ▶ Binding if below the equilibrium price: shortage.
 - ▶ Sellers must in some way ration good/service among buyers.
- ▶ A price floor is a legal minimum on the price of a good or service. Example: minimum wage.
 - ▶ Binding if above the equilibrium price: surplus.
 - ▶ Buyers' demands for the good or service must in some way be rationed among sellers.

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CHAPTER IN A NUTSHELL

- ▶ When the government levies a tax on a good, the equilibrium quantity of the good falls.
 - ▶ The tax places a wedge between the price paid by buyers and the price received by sellers.
 - ▶ Buyers pay more for the good and sellers receive less for it.
- ▶ Buyers and sellers share the tax burden.
 - ▶ The incidence of tax depends on the price elasticities of supply and demand.
 - ▶ Most of the burden falls on the side of the market that is less elastic.

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Chapter 6: Price Control and Taxation

- ▶ Markets are good?
 - ▶ Price control is bad!
- ▶ Taxation forms a wedge between P_b and P_s
- ▶ Homework:
 - ▶ Mankiw, Ch. 6, Problem 3, 5, 7-10

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Chapter 6: Price Control and Taxation

Additional Questions:

- ▶ True or False:
 - ▶ A price ceiling on wheat would cause the price of bread to fall.
- ▶ True or False:
 - ▶ True or False. iPhone 14 Pro contain A16 CPUs made by TSMC. If Apple made its own CPUs, iPhone 14 Pro would be cheaper.

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Challenge Questions/ex-Midterm:

- ▶ 2016 - Part C
- ▶ 2017 - Part D
- ▶ 2018 - Part A1, A6
- ▶ 2019 - Part B1, B3
- ▶ 2021 - Part D2
- ▶ OLD midterm (retired):
 - ▶ 2009 - (Multiple Choice Q11)
 - ▶ 2010 - (True/False Q6-Q8)
 - ▶ 2012 - (True/False Q3-Q4)
 - ▶ 2013 - (True/False Q6-Q7)

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Principles of Microeconomics

Ch.6: Supply, Demand and Government Policy

Questions about chapter 6?

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Principles of Microeconomics

Ch.6

The End

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