Lecture 8. Using Microeconomics to Understand the Real World Examples

BTM210, KAIST

Duksang Cho (KDI)

Spring 2025

Topics Covered in This Lecture

Comparing Two Equilibria

Minimum Wage

Tariffs

Price Supports, Supply Restrictions, Tax, and Subsidy

Comparing Two Equilibria

Minimum Wage

Tariffs

Price Supports, Supply Restrictions, Tax, and Subsidy

Our Strategy

- We will see
  - How to calculate the response of markets to changing economic conditions
  - How to evaluate the resulting gains and losses to consumers and producers
- Procedure
  1. Find the initial or reference equilibrium.
  2. Introduce the change (e.g., a shock or policy intervention).
  3. Determine the new equilibrium.
  4. Compare the new equilibrium with the initial one.
- Examples
  - Minimum wage, Trump's tariffs, Quota, etc.

Welfare

- How to measure the gains and losses from the changes in market prices and quantities due to a shock or government intervention?
  - Calculate the changes in consumer and producer surplus that result from an intervention.
  - Consumer surplus measures the aggregate net benefit to consumers.
  - Producer surplus measures the aggregate net benefit to producers.
  - If we lump consumers and producers together, their total welfare can be calculated.
- Welfare effects

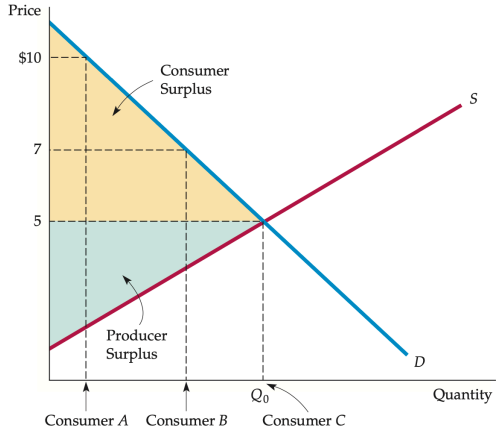
$$\Delta\text{Welfare} = \Delta\text{Total Surplus}$$

- If ΔTotal Surplus < 0, we call it "deadweight loss".

Consumer and Producer Surplus

FIGURE 9.1
CONSUMER AND PRODUCER SURPLUS

Consumer *A* would pay \$10 for a good whose market price is \$5 and therefore enjoys a benefit of \$5. Consumer *B* enjoys a benefit of \$2, and Consumer *C*, who values the good at exactly the market price, enjoys no benefit. Consumer surplus, which measures the total benefit to all consumers, is the yellow-shaded area between the demand curve and the market price. Producer surplus measures the total profits of producers, plus rents to factor inputs. It is the green-shaded area between the supply curve and the market price. Together, consumer and producer surplus measure the welfare benefit of a competitive market.

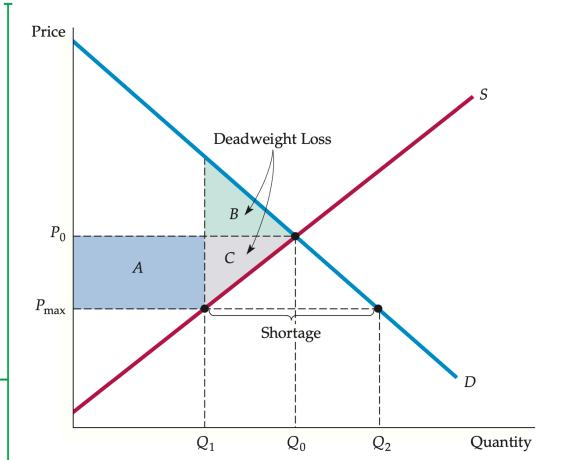


Source: *Microeconomics, 9th ed.* (Pindyck and Rubinfeld, 2018), Figure 9.1

Price Ceiling

FIGURE 9.2
CHANGE IN CONSUMER AND PRODUCER SURPLUS FROM PRICE CONTROLS

The price of a good has been regulated to be no higher than P_{max}, which is below the market-clearing price P_0. The gain to consumers is the difference between rectangle A and triangle B. The loss to producers is the sum of rectangle A and triangle C. Triangles B and C together measure the deadweight loss from price controls.



Source: *Microeconomics, 9th ed.* (Pindyck and Rubinfeld, 2018), Figure 9.2

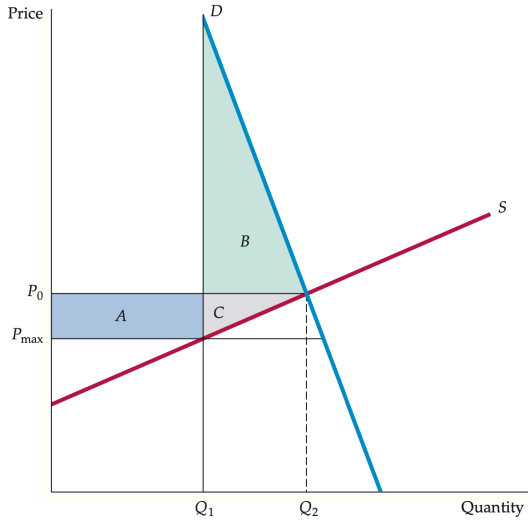


FIGURE 9.3
EFFECT OF PRICE CONTROLS WHEN DEMAND IS INELASTIC

If demand is sufficiently inelastic, triangle *B* can be larger than rectangle *A*. In this case, consumers suffer a net loss from price controls.

Source: *Microeconomics, 9th ed.* (Pindyck and Rubinfeld, 2018), Figure 9.3

Comparing Two Equilibria

Minimum Wage

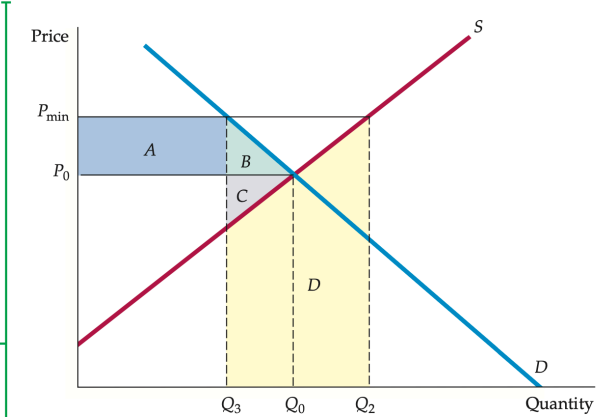
Tariffs

Price Supports, Supply Restrictions, Tax, and Subsidy

Minimum Prices

FIGURE 9.7
PRICE MINIMUM

Price is regulated to be no lower than P_{min}. Producers would like to supply Q_2, but consumers will buy only Q_3. If producers indeed produce Q_2, the amount $Q_2 - Q_3$ will go unsold and the change in producer surplus will be $A - C - D$. In this case, producers as a group may be worse off.



Source: *Microeconomics, 9th ed.* (Pindyck and Rubinfeld, 2018), Figure 9.7

Minimum Wage

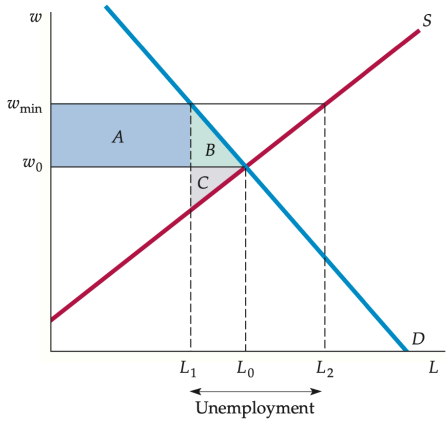


FIGURE 9.8
THE MINIMUM WAGE

Although the market-clearing wage is w_0, firms are not allowed to pay less than w_{min}. This results in unemployment of an amount $L_2 - L_1$ and a deadweight loss given by triangles *B* and *C*.

Source: *Microeconomics, 9th ed.* (Pindyck and Rubinfeld, 2018), Figure 9.8

Hold On.

- The analysis is built on the following implicit assumptions:
  - Price takers
  - Homogenous goods
  - Free entry and exit
  - A short-run equilibrium
- Why do politicians want to raise the minimum wage? What are the rationale for raising the minimum wage?
  - Corrects market failure in monopsony
  - Incentivizes productivity growth
  - Non-economic benefits: Protect the living standards of low-paid workers who are the most vulnerable in a society.
- CORE Econ, YouTube Clip, https://www.youtube.com/watch?v=99ZTpN5R3mk

Let's Be More Scientific.

- What we have learned and applied in this microeconomics course is close to a deductive reasoning, rather than an inductive reasoning.
- Can we empirically observe the impact of raising the minimum wage?
  - Card and Krueger, 1994, American Economic Review, "Minimum Wages and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania"
  - Card and Krueger, 1995, "Myth and Measurement: The New Economics of the Minimum Wage"

Unclear Answers

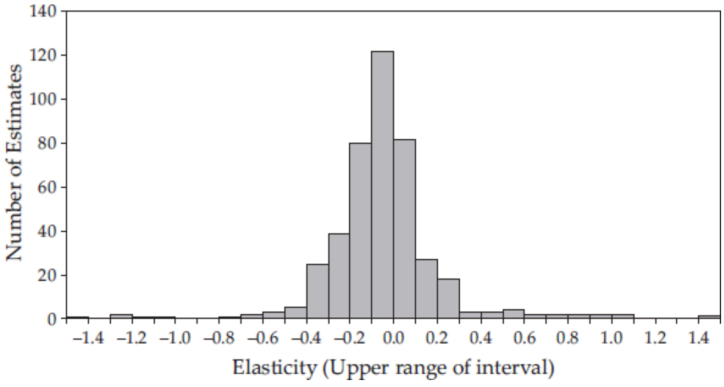


Figure 2. Distribution of Employment and Hours Elasticities (Belman and Wolfson, 2014). Histogram of 439 estimated elasticities of employment or hours with respect to minimum wage, derived from 23 separate studies, as reported in Belman and Wolfson (2014). Median elasticity is -0.05; precision-weighted median is -0.03.

Source: *Myth and Measurement: The New Economics of the Minimum Wage* (Card and Krueger, 1995)

Card and Krueger (1994, AER)

- **Objective**: Assess the impact of minimum wage increases on employment
- **Methodology**: Natural experiment comparing fast-food restaurants in New Jersey and Pennsylvania
- **Research Design**
  - Policy Change: On April 1, 1992, New Jersey raised its minimum wage from $4.25 to $5.05 per hour
  - Control Group: Eastern Pennsylvania, where the minimum wage remained at $4.25
  - Data Collection: Surveys conducted at 410 fast-food restaurants before and after the wage increase
  - Analysis: Difference-in-differences approach to compare employment changes

Card and Krueger (1994, AER)

- **Key findings**
  - Contrary to traditional economic theory, employment increased in New Jersey relative to Pennsylvania
  - Average wages rose in New Jersey without corresponding job losses
  - Slight increase in menu prices observed in New Jersey
  - Minimum wage increase did not lead to job reductions in the fast-food industry
- **Theoretical implications**
  - Findings contradict the notion that higher wages reduce employment
  - Suggests employers may have wage-setting power, allowing for wage increases without job losses
  - Indicates that moderate increases in minimum wage may not adversely affect employment

Minimum Wage Hikes in South Korea

- **Minimum Wage Hikes**: KRW 6,470(2017) $\rightarrow$ KRW 7,530(2018, $+16.4\%$) $\rightarrow$ KRW 8,350 (2019, $+10.9\%$), followed by slower increases.
- **Pro Arguments (Income Growth and Domestic Demand)**
  - Higher wages $\Rightarrow$ increased household income $\Rightarrow$ consumption $\Rightarrow$ job creation
  - Productivity incentive: skill accumulation, automation
  - Improved income distribution: reduced wage inequality, expanded middle-class consumption
  - Empirical evidence (Hong et al., 2022): 8–10% increase in hourly wage, 6–8% increase in monthly earnings

Counterarguments

- **Counterarguments (Adverse Effects of Rapid Hikes)**
  - Job losses: higher labor costs for small businesses, layoffs, closures
  - Harm to vulnerable groups: youth, low-skilled, elderly workers
  - Investment reduction: rising labor costs $\Rightarrow$ decreased capital investment
  - Warnings from IMF/OECD: *"Risks to employment and inflation"*
- **Employment Indicators**
  - 2018 job increase: only 97,000 (lowest since 2009)
- **Growth Effects**
  - GDP growth: 3.1% (2017) $\rightarrow$ 2.9% (2018), 2.0% (2019)
  - Limited consumption boost, but decline in investment and exports

Overall Assessment and Policy Implications

- **Positive Effects**
  - Improved earnings for low-wage workers, upward wage distribution shift
  - Productivity gains, restructuring toward higher-quality jobs
- **Negative Effects**
  - Employment shocks, burden on SMEs, job losses for some groups
  - Constraints on growth, decline in private investment
- **Policy Implications**
  - Rapid hikes cause disruption: need for gradual adjustments
  - Complementary measures (e.g., productivity support) needed
  - Consider differentiated wage setting mechanisms based on economic conditions

Comparing Two Equilibria

Minimum Wage

Tariffs

Price Supports, Supply Restrictions, Tax, and Subsidy

Import Tariff or Quota

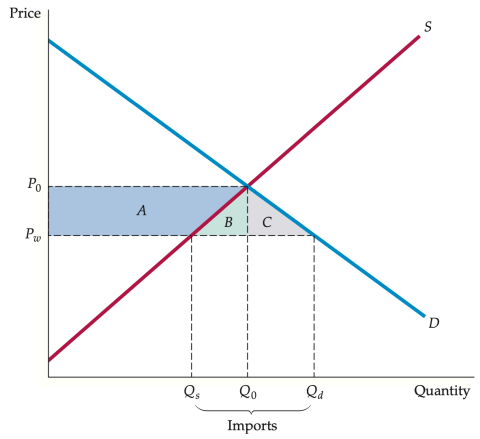


FIGURE 9.16
IMPORT TARIFF OR QUOTA THAT ELIMINATES IMPORTS

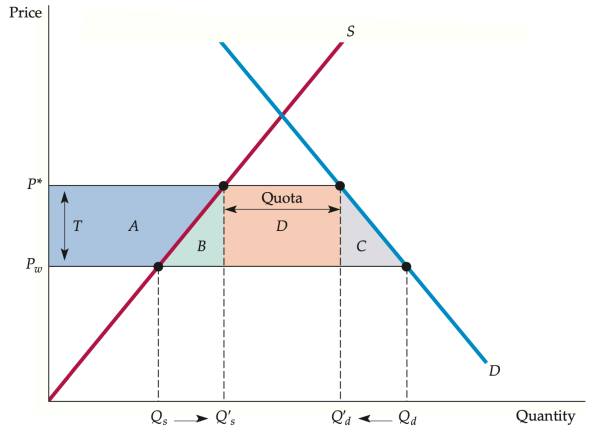
In a free market, the domestic price equals the world price P_w. A total Q_d is consumed, of which Q_s is supplied domestically and the rest imported. When imports are eliminated, the price is increased to P_0. The gain to producers is trapezoid A. The loss to consumers is $A + B + C$, so the deadweight loss is $B + C$.

Source: *Microeconomics, 9th ed.* (Pindyck and Rubinfeld, 2018), Figure 9.16

Import Tariff or Quota

FIGURE 9.17
IMPORT TARIFF OR QUOTA (GENERAL CASE)

When imports are reduced, the domestic price is increased from P_w to P^*. This can be achieved by a quota, or by a tariff $T = P^* - P_w$. Trapezoid A is again the gain to domestic producers. The loss to consumers is $A + B + C + D$. If a tariff is used, the government gains D, the revenue from the tariff, so the net domestic loss is $B + C$. If a quota is used instead, rectangle D becomes part of the profits of foreign producers, and the net domestic loss is $B + C + D$.



Source: *Microeconomics, 9th ed.* (Pindyck and Rubinfeld, 2018), Figure 9.17

Trump's First Term: Negotiated Outcome w/ South Korea

- **March 2018:** Trump imposed 25% tariff on imported steel under Section 232 (national security).
- **South Korea' s Response:**
  - Avoided tariffs by agreeing to a quota system.
  - Quota set at **70% of 2015–2017 average export volume**.
  - Effective from **May 2018**.
- **For the U.S.:**
  - Achieved import control while maintaining alliances.
- **Policy Insight:**
  - Example of **Trump' s negotiation-driven protectionism**.
  - Similar deals made with other allies (e.g., EU, Brazil).

Trump's Second Term: Trump Introduced Higher Tariffs.

- **Why?**
  - Reducing the U.S. trade deficit
    - "We're going to start being smart, and we're going to start being very wealthy again," Trump stated during his "Liberation Day" speech.
  - Generating revenue for the U.S. government
    - He stated that the new policy would generate "trillions and trillions of dollars to reduce our taxes and pay down our national debt."
  - Revitalizing domestic manufacturing, Protecting national security
- **WSJ YouTube Explained**
  - "Trump Is Waging War on the U.S. Trade Deficit—Does It Even Need Fixing?" https://youtu.be/CygrmYdJOXg?feature=shared

A Digression: How Can the U.S. Sustain a Large Trade Deficit?

- The U.S. dollar is the world' s primary reserve currency.
  - Used in global trade, finance, and as central banks' key holding.
- How it works?
  - Korea, China, and Japan export goods to the U.S.,
  - Earn U.S. dollars,
  - Reinvest those dollars into the U.S. capital market by purchasing bonds, stocks, or real estate.

A Digression: Twin Deficit

- The "twin deficit" refers to the simultaneous occurrence of a government deficit (fiscal deficit) and a trade deficit (current account deficit) in an economy.

$$Y = C + I + G + NX$$

$$Y - C - G = I + NX$$

$$\text{Private saving} + \text{Government saving} = I - \text{Trade deficit}$$

$$\text{Private saving} + \text{Trade deficit} = I + \text{Government deficit}$$

$$\Delta\text{Trade deficit} \propto \Delta\text{Government deficit}$$

Problem of the Growing U.S. Twin Deficit

Problem	**Effect**
↑ **Govt borrowing**	↑ Interest rates, crowding out private investment
Capital inflows	↑ Dollar value, ↓ Net exports (widening trade deficit)
↑ **Foreign financing**	Vulnerability to sudden capital outflows
Growing debt burdens	Risk to long-term fiscal sustainability and policy flexibility

Interest Payments on the U.S. Government Debt (2020–2026)

Year	Spending (Billion USD)	Avg. Growth Rate	Budget Share (%)
2020	376	0.0%	5.4%
2021	413	9.8%	5.7%
2022	475	15.0%	6.3%
2023	628	32.2%	8.7%
2024	881	40.3%	12.6%
2025	952	8.1%	**13.6%**
2026	1050	10.3%	14.2%

- Sustainable? What would you do if you are the president of the U.S.?

$$\text{Private saving} + \text{Trade deficit} = I + \text{Government deficit}$$

Can We Say That Tariff Hikes Are Beneficial Overall?

- Trump's tariffs might be good for the U.S., but not for the world economy.
  - The International Monetary Fund (IMF) released its April 2025 World Economic Outlook (WEO) on April 22, 2025, highlighting significant concerns about the global economy amid escalating trade tensions and policy uncertainties.
  - **Growth Projections:** The IMF downgraded global growth forecasts to 2.8% for 2025 and 3.0% for 2026, a cumulative reduction of 0.8%p from the January 2025 estimates. (the 2000–2019 average of 3.7%)
  - **Trade Impact:** Global trade growth is projected to decline to 1.7% in 2025, reflecting disruptions from heightened tariffs and supply chain uncertainties.

Comparing Two Equilibria

Minimum Wage

Tariffs

Price Supports, Supply Restrictions, Tax, and Subsidy

Price Supports

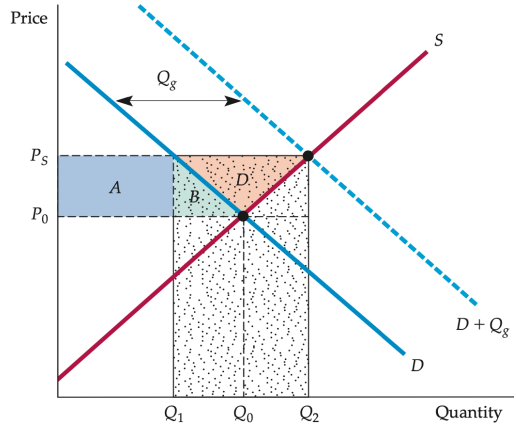


FIGURE 9.11
PRICE SUPPORTS

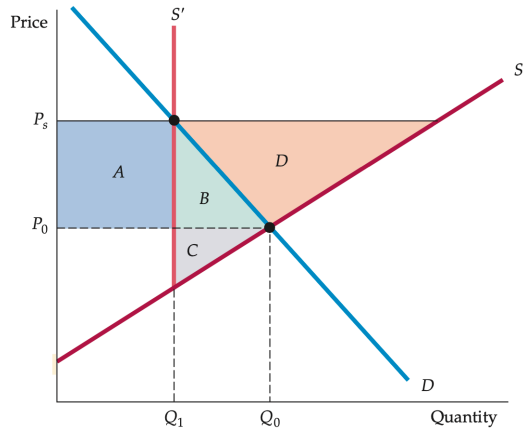
To maintain a price P_s above the market-clearing price P_0, the government buys a quantity Q_g. The gain to producers is $A + B + D$. The loss to consumers is $A + B$. The cost to the government is the speckled rectangle, the area of which is $P_s(Q_2 - Q_1)$.

Source: *Microeconomics, 9th ed.* (Pindyck and Rubinfeld, 2018), Figure 9.11

Supply Restrictions

FIGURE 9.12
SUPPLY RESTRICTIONS

To maintain a price P_s above the market-clearing price P_0, the government can restrict supply to Q_1, either by imposing production quotas (as with taxicab medallions) or by giving producers a financial incentive to reduce output (as with acreage limitations in agriculture). For an incentive to work, it must be at least as large as $B + C + D$, which would be the additional profit earned by planting, given the higher price P_s. The cost to the government is therefore at least $B + C + D$.

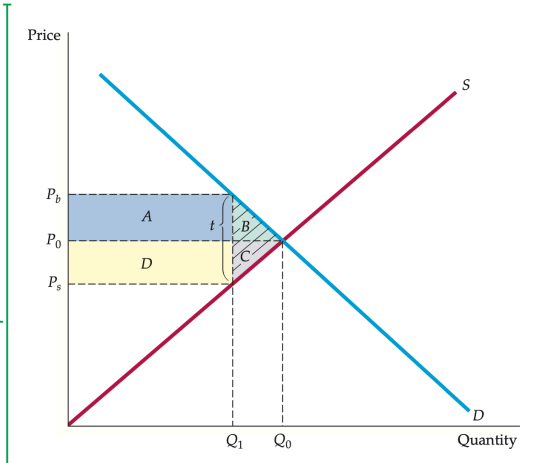


Source: *Microeconomics, 9th ed.* (Pindyck and Rubinfeld, 2018), Figure 9.12

Tax

FIGURE 9.19
INCIDENCE OF A TAX

P_b is the price (including the tax) paid by buyers. P_s is the price that sellers receive, less the tax. Here the burden of the tax is split evenly between buyers and sellers. Buyers lose $A + B$, sellers lose $D + C$, and the government earns $A + D$ in revenue. The deadweight loss is $B + C$.



Source: *Microeconomics, 9th ed.* (Pindyck and Rubinfeld, 2018), Figure 9.19

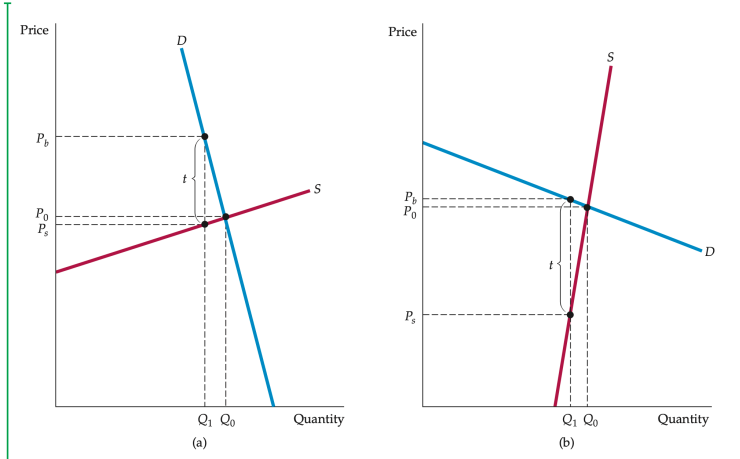


FIGURE 9.20
IMPACT OF A TAX DEPENDS ON ELASTICITIES OF SUPPLY AND DEMAND

(a) If demand is very inelastic relative to supply, the burden of the tax falls mostly on buyers.
(b) If demand is very elastic relative to supply, it falls mostly on sellers.

Source: *Microeconomics, 9th ed.* (Pindyck and Rubinfeld, 2018), Figure 9.20

Subsidy

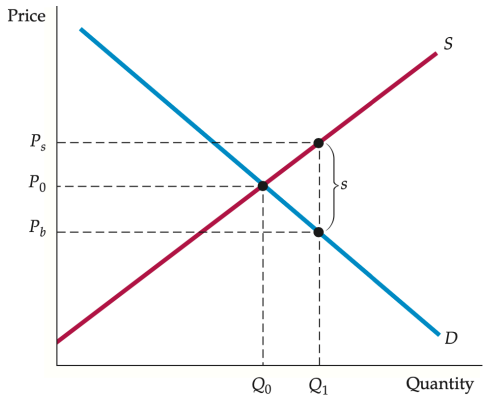


FIGURE 9.21
SUBSIDY

A subsidy can be thought of as a negative tax. Like a tax, the benefit of a subsidy is split between buyers and sellers, depending on the relative elasticities of supply and demand.

Source: *Microeconomics, 9th ed.* (Pindyck and Rubinfeld, 2018), Figure 9.21

Example

- Suppose the market for widgets can be described by the following equations:

$$\text{Demand: } P = 10 - Q, \quad \text{Supply: } P = Q - 4.$$

where P is the price in dollars per unit and Q is the quantity in thousands of units.

  - What is the equilibrium price and quantity? (Q=7, P=$3)
  - Suppose the government imposes a tax of $1 per unit to raise government revenues. What will the new equilibrium quantity be? (Q=6.5) What price will the buyer pay? ($3.5) What amount per unit will the seller receive? ($2.5)
  - The tax is removed and a subsidy of $1 per unit granted to widget producers. What will the equilibrium quantity be? (Q=7.5) What price will the buyer pay? ($2.5) What amount per unit (including the subsidy) will the seller receive? ($3.5) What will be the total cost to the government? ($7.5 thousand)