Chapter 2

Supply and Demand

Professor Lakshmi K. Raut

Chapter Outline

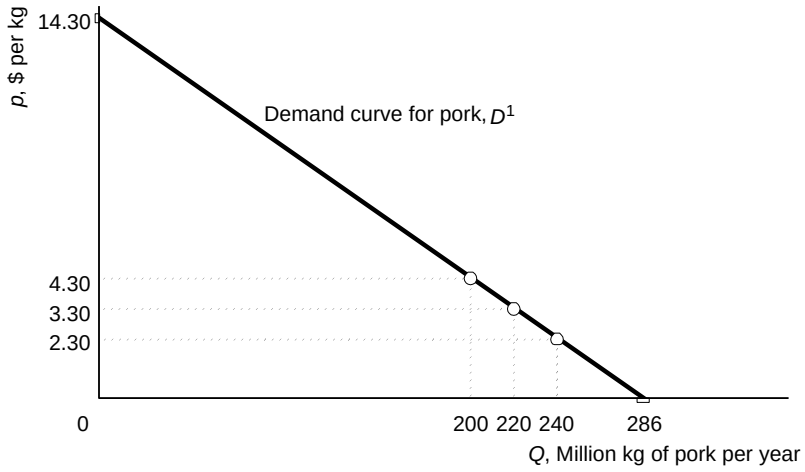
Chapter 2: Supply and Demand
Key Concepts

- A demand curve shows the amount of a good or service that consumers want to buy at each possible price.
- A supply curve shows the amount of a good or service that firms want to sell at each possible price.
- When only price changes, there is a movement along a demand (or supply) curve.
- Changes in factors other than the good's price can cause its demand (or supply) curve to shift.
- Market equilibrium occurs at the price and quantity where the supply curve and the demand curve intersect.
- Price ceilings and floors do not shift demand or supply curves, but they can cause movements along these curves and block the market from reaching equilibrium.

The demand

- **Factors affecting demand for a good**: Taste, information, prices of other goods, incomes, government rules and regulations, other factors, and the price of the good.
- **Demand Curve:** The amount of a good that consumers are willing to buy at a given price, holding constant the other factors that influence purchases, is the *quantity demanded.* A *demand curve* shows the quantity at each possible price, holding all other factors constant.
- **Law of Demand:** Holding all other factors constant, when price increases the demand falls. This is true of all goods, and known as law of demand.

Figure 2.1 A Demand Curve



Demand Function

- Explain demand function $Q=D(p,p_b,p_c,Y)$
  - Example of the book
- Inverse Demand Function $p = P(Q,p_b,p_c,Y)$
  - Example of the book, draw the inverse demand function, and calculate the slope of the deamand function as rise over run.
- Change value of one of the factors from the above say price of beef to ___ and compute the new inverse demand function, and plot it. Show that it involves shifting the previous demand curve.

Demand function

- general function

$$Q = D(p, p_b, p_c, Y)$$

- specific (linear) pork demand function

$$Q = 171 - 20p + 20p_b + 3p_c + 2Y$$

Hold other factors constant

- D^1 (Figure 2.1) holds p_b, p_c, and Y at their typical values:

  p_b = \$4 per kg

  p_c = \$3 1/3 per kg

  Y = \$12.5 thousand

- $Q = 171 – 20p + 20p_b + 3p_c + 2Y$

  $= 171 – 20p + (20 \times 4) + (3 \times 3\ 1/3) + (2 \times 12.5)$

  $= 286 – 20p$

Plotting demand function: Intercept

- $Q = 286 - 20p$
- constant term, 286, is the quantity demanded if price is zero
  - $Q = 286 - (20 \times 0) = 286$
  - D^1 hits quantity axis at 286 (price = 0)

Plotting demand function: Slope

- $Q = 286 - 20p$
- number on price, 20, is rate at which quantity changes as price changes

$$\Delta Q = Q_2 - Q_1 = D(p_2) - D(p_1)$$
$$= (286 - 20p_2) - (286 - 20p_1)$$
$$= -20(p_2 - p_1) = -20\Delta p$$

- $\Delta p = \$1 \Rightarrow$

$\Delta Q = -20\Delta p = -20$ million kg per year

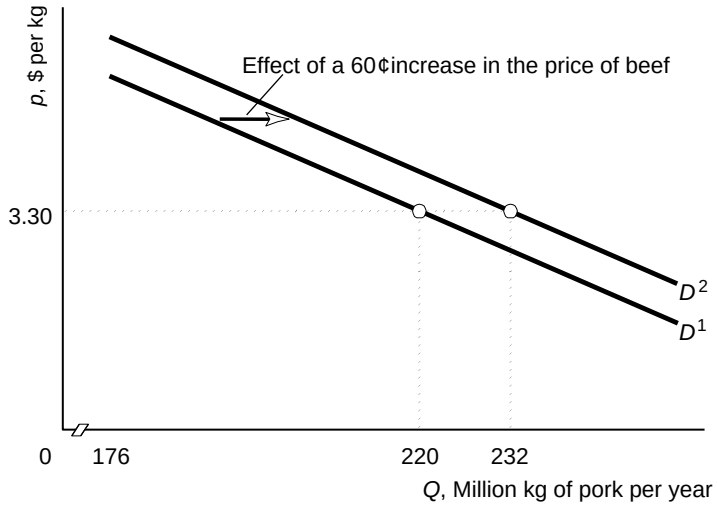
Slope of pork demand curve

- $\Delta p/\Delta Q$ = [the "rise"]/[the "run"]
  = [$1 per kg]/[-20 million kg per year]
  = -$0.05 per million kg per year
- negative sign is consistent with Law of Demand

Practice in class example

- Do the above exercise with
- $Q = 200 - 10p + 30p_b + 6p_c + 4Y$
- *Holding constant:*
  p_b = $4 per kg
  p_c = $3 1/3 per kg
  Y = $12.5 thousand
- *Derive demand function, Q=D(p), inverse demand function p= P(q). Plot the inverse demand function. The graph of the inverse demand function is known as* ***demand curve***. *Change* p_b = $6, derive the new inverse demand funciton and plot it. Examine how the demand curve shifts

Figure 2.2
A Shift of the Demand Curve



Aggregating Demand from various sources

- Q1=D1(p)
- Q2=D2(p)
- The aggregate demand of the above two is
- Q= Q1 + Q2=D1(p)+D2(p)
- Analytical example:
  - D1(p)= 10-2p; D2(p)=20-3p what is the aggregate demand function Q=D(p)?
  - Q = D(p)=D1(p)+D2(p) = 10-2p+20-3p
  - Hence, D(p)= 30-5p
- Graphically in the next slide.

Application (Page 20) Aggregating the Demand for Cling Peaches

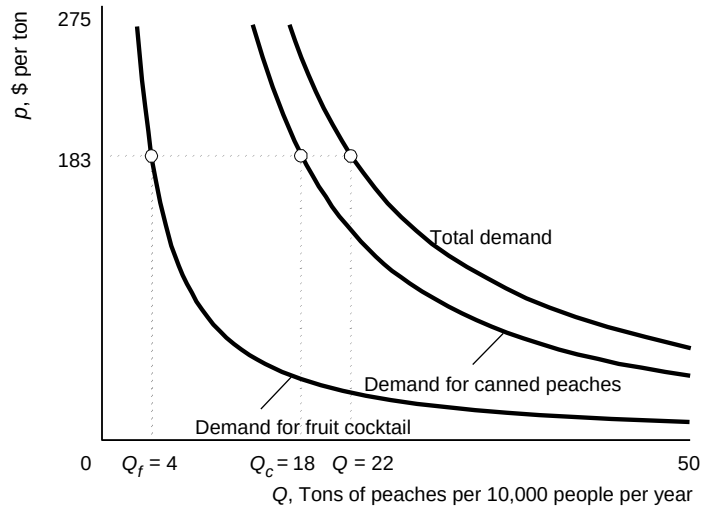


Figure 2.3 A Supply Curve

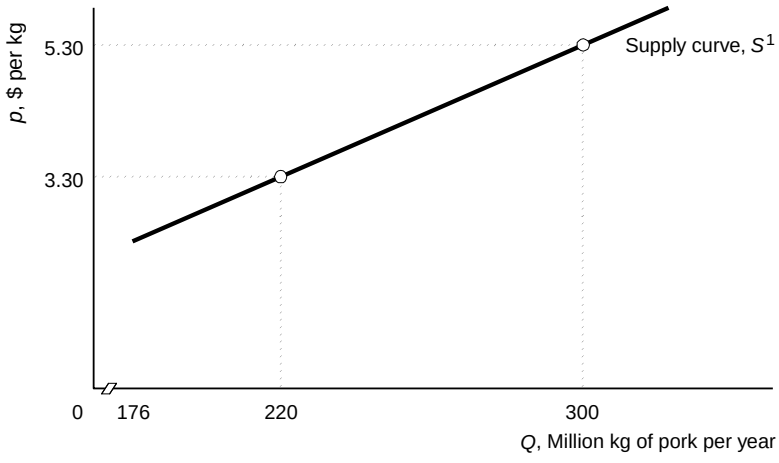
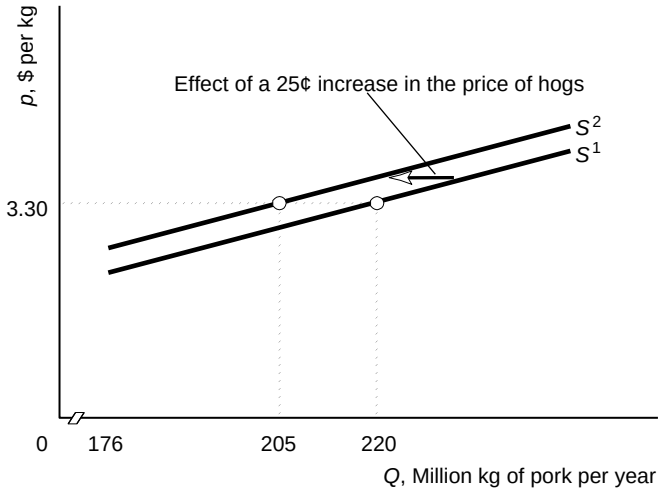


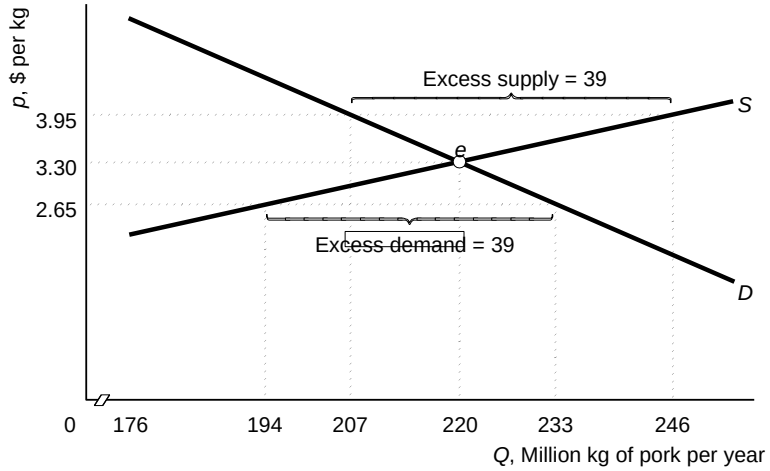
Figure 2.4
A Shift of a Supply Curve



Market Equilibrium

- When all traders are able to buy and sell as much as they want, we say that the market is in **equilibrium**: a situation in which no participant wants to change its behavior.
- A price at which consumers can buy as much as they want and sellers can sell as much as they want is called **equilibrium price.**
- The quantity that is bought and sold at the equilibrium price is called the **equilibrium quantity.**
- We will both graphically and analytically determine the equilibrium price and quantity of pork market. Later we will also examine how government regulations affect the equilibrium price and quantity.

Figure 2.6 Market Equilibrium



Using the math compute equilibrium price and quantity

- Read pages 27-32
- $Q_d(p) = 286-20p$
- $Q_s(p) = 88 + 40p$
- Market equilibrium: Find p such that demand = suppy at that price, i.e., $Q_d(p) = Q_s(p)$
- After you find p, substitute it in either the demand function or the supply function to obtain the equilibrium quantity.

Compute Market Equilibrium Analytically

- If demand for show tickets is described by the equation $Q_D = 100 - p$, and supply is $Q_S = 20 + p$, find the equilibrium price and quantity.

Set $Q_D = Q_S$ and solve.

For $Q_S = 20 + p$

$100 - p = 20 + p$

$p^* = 40$

$Q^* = 60$

- How would your answer change if the supply curve shifted to $Q_S' = 10 + p$ due to increases in actor salaries?

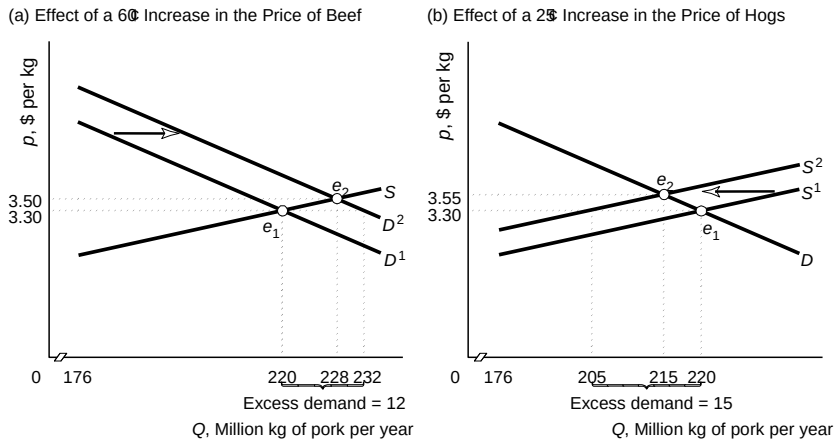
For $Q' = 10 + p$

$100 - p = 10 + p$

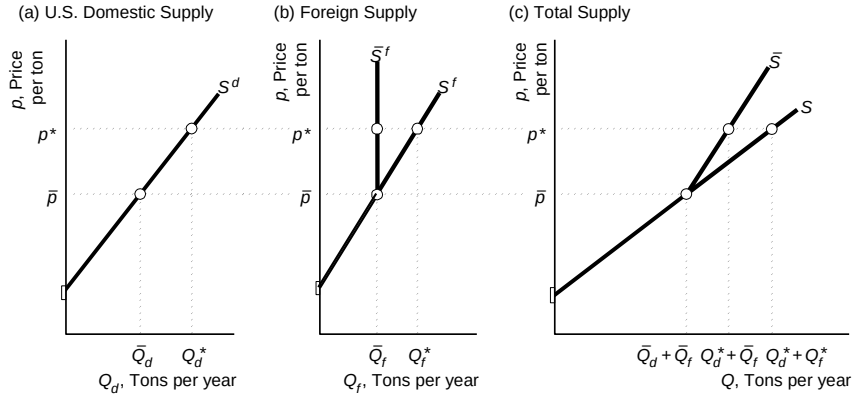
$p^* = 45$

$Q^* = 55$

Figure 2.7 Effects of a Shift of the Demand Curve



Page 21 Solved Problem 2.1



Page 34 Solved Problem 2.3

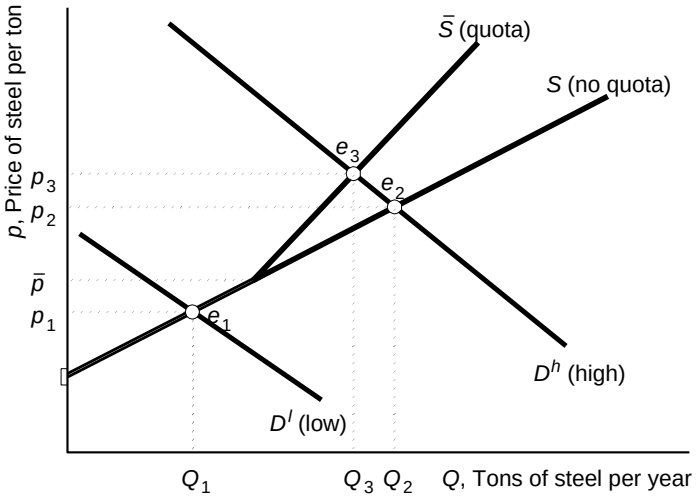
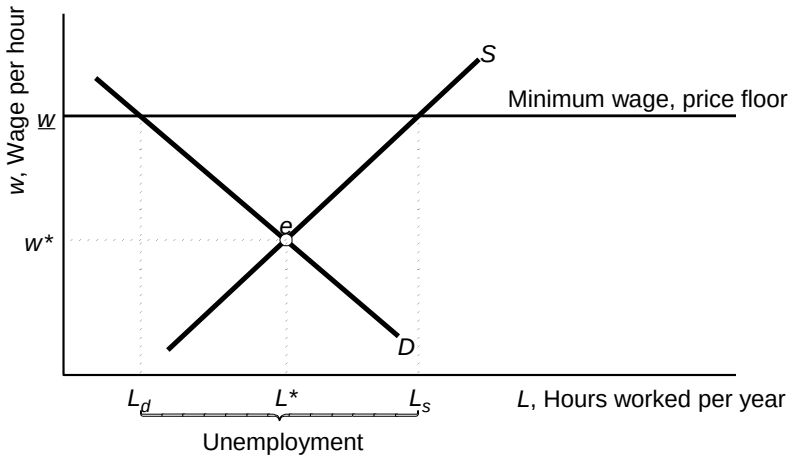


Figure 2.10 Minimum Wage



When to use supply and demand model

- many buyers and sellers
- firms sell identical goods
- firms are price takers
- no uncertainty: everyone has full information about price and quality of goods
- low transaction costs: buyers and sellers can trade easily

Supply and demand model inappropriate where

- only a few sellers (auto manufacturers)
- buyers and sellers are uncertain about the market equilibrium (concert music business)
- consumers know much less than sellers about quality or price (used cars)
- high transaction costs (art work)

Use supply and demand model in

- agricultural markets
- financial
- labor
- construction
- services
- wholesale
- retail