Lecture 1. Introduction

BTM210, KAIST

Duksang Cho (KDI)

Spring 2025

Overview

What Is Microeconomics?

An Overview: Supply, Demand, and Equilibrium

Elasticity

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Elasticity

What Is Microeconomics?

- Microeconomics (미시경제학)
  1. Is "Micro"-ish & "Economics",
  2. Deals with individual economic agent's behavior,
     - A consumer, producer, worker, firm, investor, parent, student, ···
  3. Explains how and why these agents make economic decisions,
     - Consumer's decision on purchasing goods and services
     - Firm's decision on hiring, producing, investing
     - Student's decision on watching YouTube vs. reading Microeconomics textbook
  4. Studies interactions among agents in a market.
     - Equilibrium: prices and quantities determined in a market
     - Various market structures: competitive market vs. monopoly
     - Government policies: The necessity and risks of government intervention

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Understanding Microeconomics in Comparison to Macroeconomics

- Macroeconomics
  - Studies aggregate variables and their interactions over time
  - GDP, growth rates, interest rates, unemployment, inflation, $\cdots$
- Modern macroeconomics is based on microeconomic foundations.
  - Households' utility maximization
  - Firms' profit maximization
  - Market clearing in a general equilibrium
- The distinction between macro and micro has become less and less clear in recent years.
  - The core concepts of microeconomics are essential for studying all branches of modern economics.

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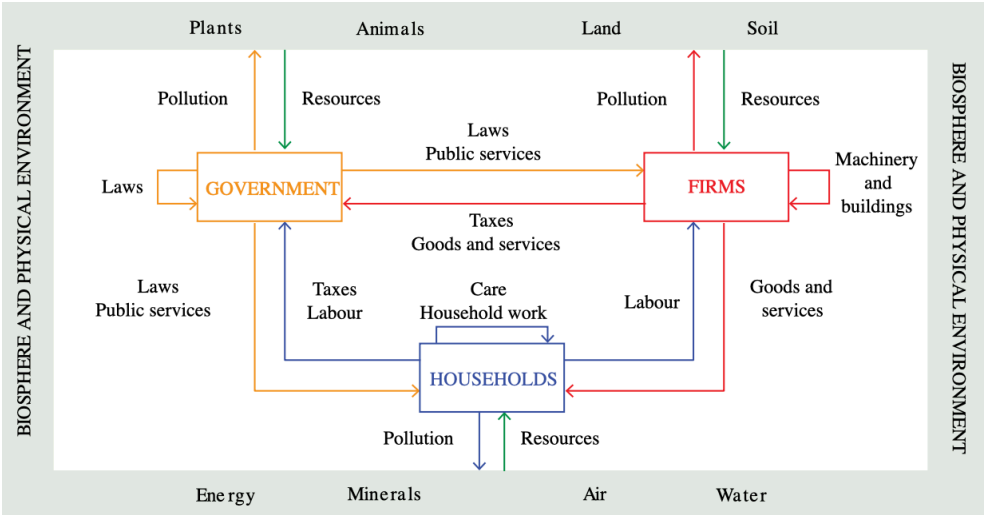
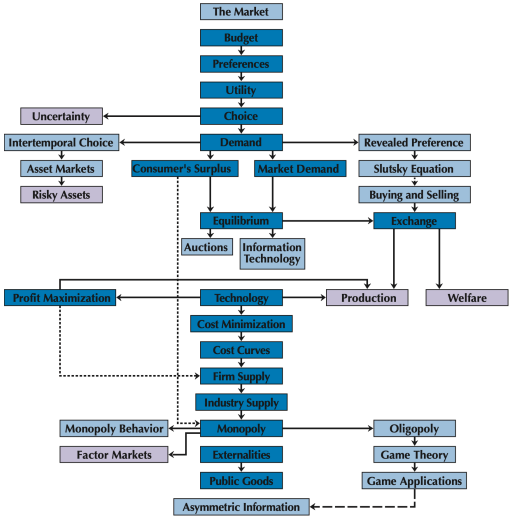
Individual Economic Agents and a Model of the Economy



Source: *The Economy 2.0: Microeconomics*, Figure 1.21: A model of the economy: flows of resources.

A Typical Structure of Learning Microeconomics



Source: *Intermediate Microeconomics, 9th ed.* (Varian, 2020), A figure in the Preface

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- An economic agent's constrained optimization
  - A consumer's utility maximization problem given his or her budget constraint
  - A firm's profit maximization problem given technologies, factor prices, etc.
  - A government's problem of making or regulating market environments
- Analyzing interactions of these agents in markets
  - How prices and quantities are determined in a market
  - How market structures affect economic agents' decision and equilibrium outputs
  - How government can improve or distort equilibrium outputs
- Additional topics
  - Uncertainty, asymmetric information, monopoly, oligopoly, game theory, externality, market failure, welfare, $\cdots$

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Good to Know Before Getting Started

- Trade-Offs
  - Making optimal trade-offs is an important theme in economics.
- Competitive Markets
  - A market is the collection of buyers and sellers, which determines the equilibrium price and quantity of goods and services.
  - A perfectly competitive market has many buyers and sellers, so that no single buyer or seller has any impact on price.
  - In a noncompetitive market, individual firms can jointly affect the price.
- Nominal vs. Real Prices
  - Nominal price is the absolute price of a good, unadjusted for inflation.
  - Real price of a good is the price relative to an aggregate measure of prices (e.g., CPI, PPI, GDP deflator), adjusted for inflation.

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  - Models are mathematical representations based on economic theory.
  - Economic theories and models are always imperfect: only roughly correct in a certain sense.
  - Because they are based on plausible assumptions many of which are neither observed nor controlled.
  - But very effective, successful tools to understand complicated real world problems
- Positive vs. Normative Analysis
  - Positive analysis is what things are
  - Normative analysis is what things should be

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  - Theories explain observed phenomena in terms of some rules and assumptions.
  - Models are mathematical representations based on economic theory.
  - Economic theories and models are always imperfect: only roughly correct in a certain sense.
  - Because they are based on plausible assumptions many of which are neither observed nor controlled.
  - But very effective, successful tools to understand complicated real world problems
- Positive vs. Normative Analysis
  - Positive analysis is what things are
  - Normative analysis is what things should be

What Is Microeconomics?

An Overview: Supply, Demand, and Equilibrium

Elasticity

Supply, Demand, and Equilibrium in the Market

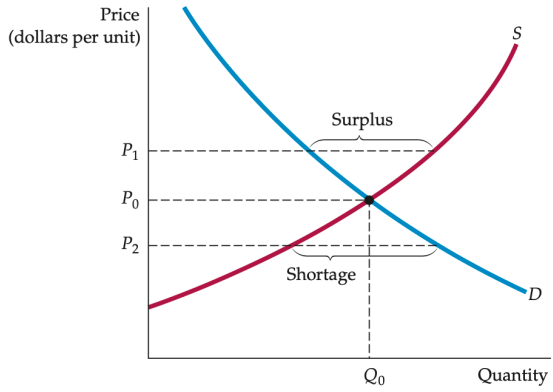
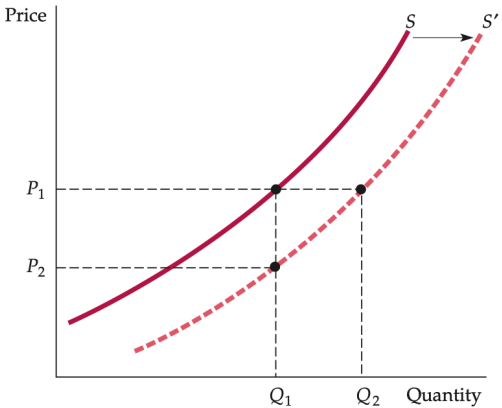


FIGURE 2.3
SUPPLY AND DEMAND

The market clears at price P_0 and quantity Q_0. At the higher price P_1, a surplus develops, so price falls. At the lower price P_2, there is a shortage, so price is bid up.

Source: *Microeconomics, 9th ed.* (Pindyck and Rubinfeld, 2018), Figure 2.3 Supply and Demand

The Supply Curve



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- The supply curve (S) shows the quantity of a good (Q) that producers are willing to sell at a given price (P).

$$Q_S = Q_S(P)$$

- Upward sloping: As the price increases, firms are more able and willing to produce and sell.
- The supply curve shifts if economic environments or assumptions behind the scenes change.

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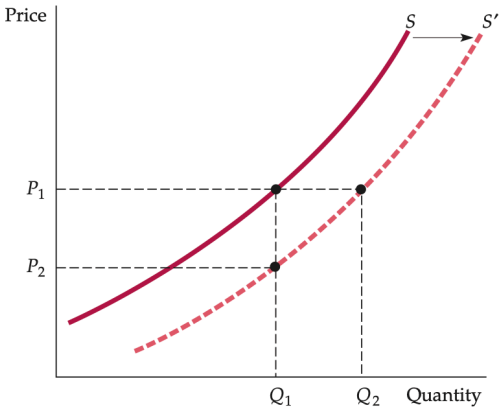

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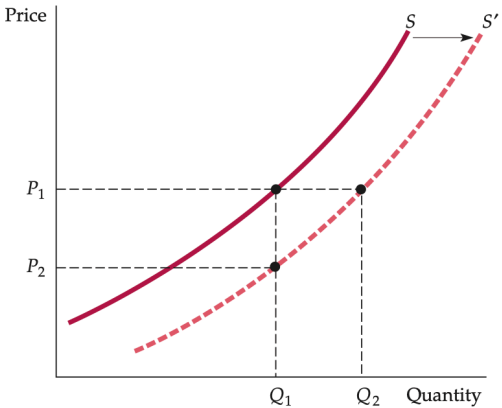

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Upward Sloping Supply Curve

- Suppose that the price rises.
- Each firm can produce more.
  - A higher price may enable current firms to expand production.
  - By hiring extra workers or having workers work overtime at greater cost to the firm.
- More firms can enter the market and supply more.
  - A higher price can attract new firms to the market.
  - These newcomers would have found entry unprofitable at a lower price.
- Besides,
  - By considering the reasoning behind the upward-sloping supply curve, we can understand how economists think.
  - Examine the economy, simplify the problem, and build a theory and a model.

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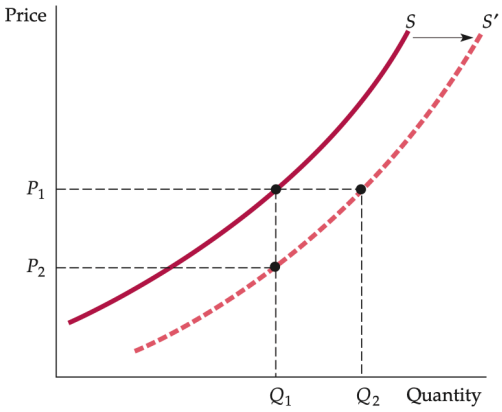
A Movement Along vs. a Shift of the Supply Curve



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$$Q_S = Q_S(P|\text{the cost of raw materials})$$

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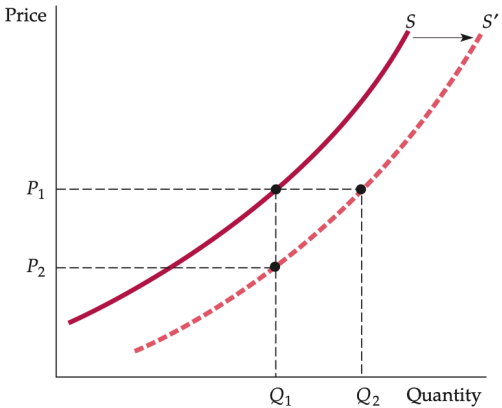

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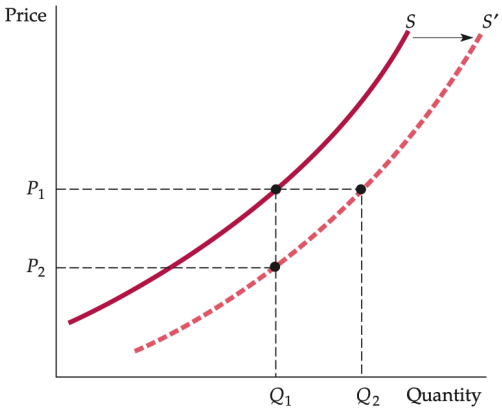

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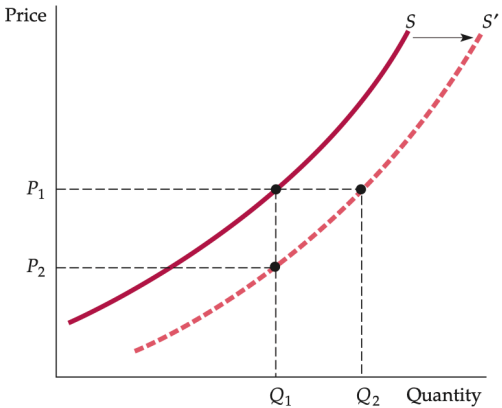

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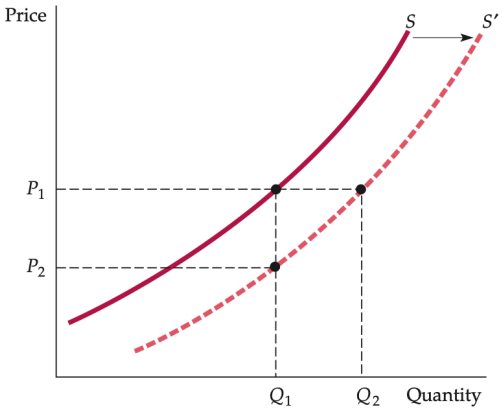

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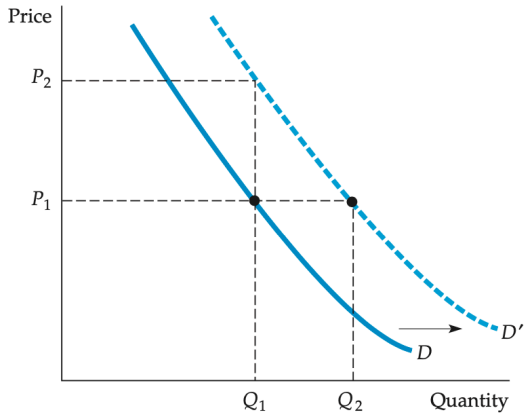

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The Demand Curve

- The demand curve (D) shows how much of a good (Q) consumers are willing to buy as the price (P) changes.

$$Q_D = Q_D(P)$$

- Downward sloping: consumers buying more if the price is lower.
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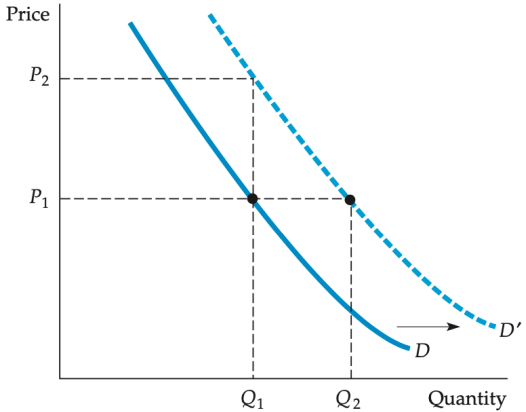

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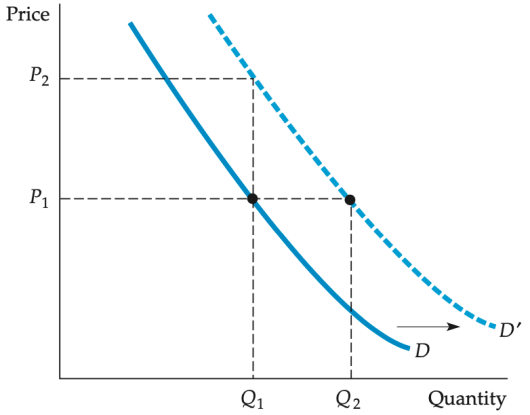

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Downward Sloping Demand Curve

- Suppose that the price falls.
- Each consumer can buy more.
  - Given his or her budget constraint,
  - A lower price may encourage consumers who have already been buying the good to consume larger quantities.
- More consumers can or will begin to buy.
  - Consumers who were previously unable to afford the good to begin buying goods.
  - Consumers who previously didn't want to buy the product to begin buying goods.
- Very intuitive result: $\frac{dQ_D}{dP} < 0$
  - Hard to find exception

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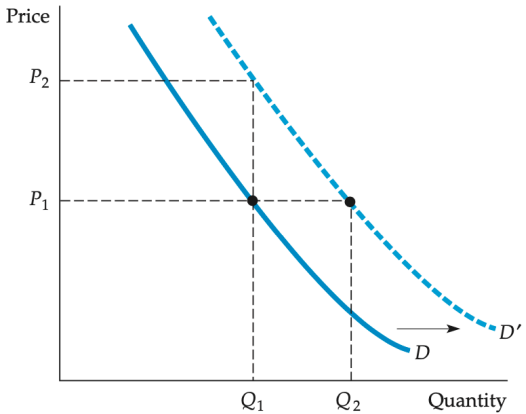

Source: *Microeconomics, 9th ed.* (Pindyck and Rubinfeld, 2018), Figure 2.2 The Demand Curve

- Suppose that income levels increase.

$$Q_D = Q_D(P|\text{consumers' income})$$

- Consumers can buy more and are willing to pay more.
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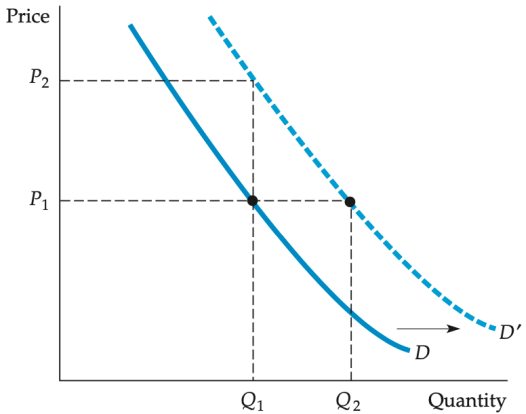

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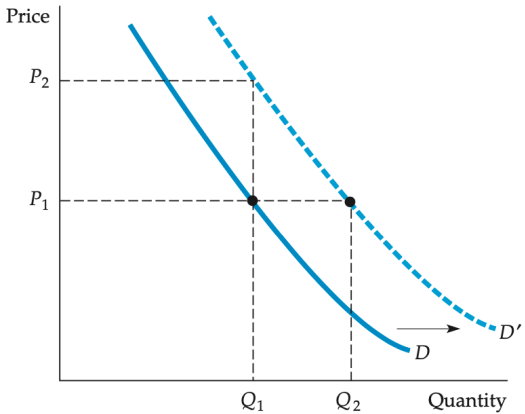

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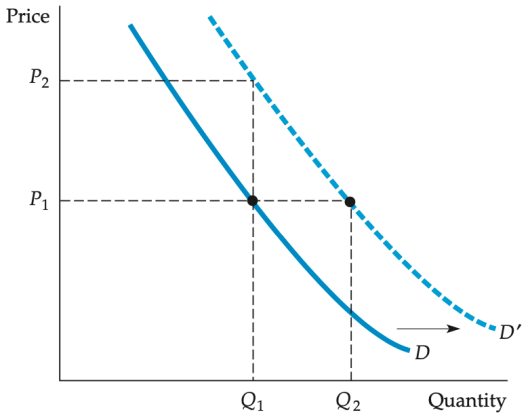

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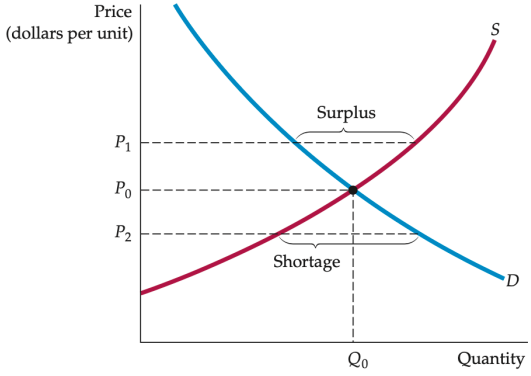
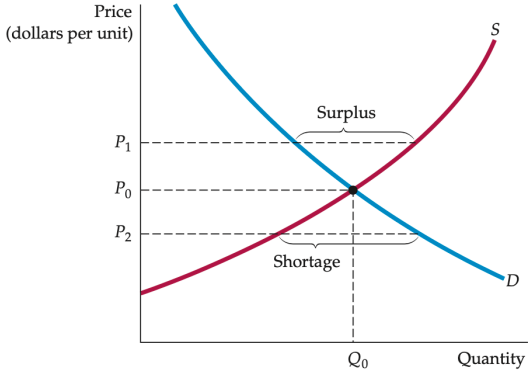


Source: *Microeconomics, 9th ed.* (Pindyck and Rubinfeld, 2018), Figure 2.3 Supply and Demand

- The S and D curves intersect at the equilibrium price(P_0) and quantity(Q_0).
- At P_0, the quantity supplied and the quantity demanded are equal.
- In a competitive market, price is adjusted until the market clears.
- In physics, a particle's momentum changes until the net force is zero.

$$F = ma = \frac{dP}{dt} = 0 \text{ (uniform motion)}$$

Equilibrium



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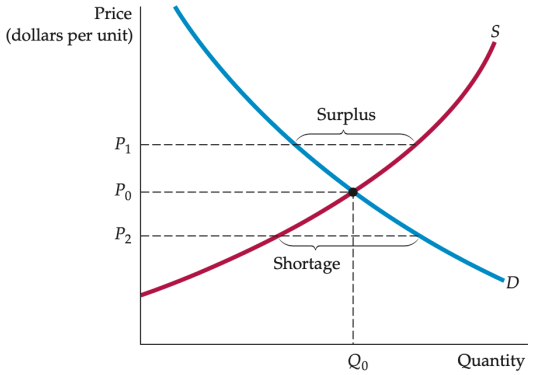

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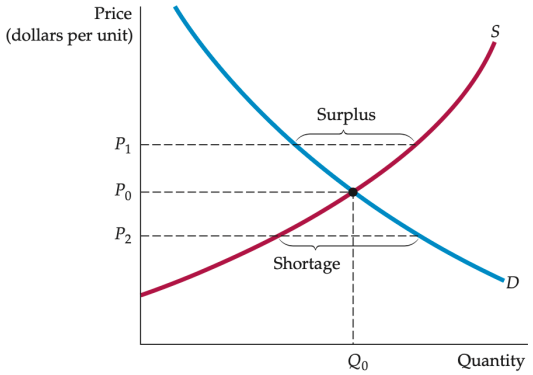

Source: *Microeconomics, 9th ed.* (Pindyck and Rubinfeld, 2018), Figure 2.3 Supply and Demand

- The S and D curves intersect at the equilibrium price(P_0) and quantity(Q_0).
- At P_0, the quantity supplied and the quantity demanded are equal.
- In a competitive market, price is adjusted until the market clears.
- In physics, a particle's momentum changes until the net force is zero.

$$F = ma = \frac{dP}{dt} = 0 \text{ (uniform motion)}$$

Assumptions Behind the Scenes: Competitive Markets

- In a competitive market
  - Both sellers and buyers have little market power.
  - They have no ability to affect the market price.
  - They are price takers.
- Non-competitive markets
  - Monopoly: supply is controlled by a single producer, a monopolist.
  - Monopsony: a single buyer controls the demand for goods and services.
  - Both are price setters in their respective markets.
- When we draw and use supply and demand curves, we are assuming at least roughly competitive markets.

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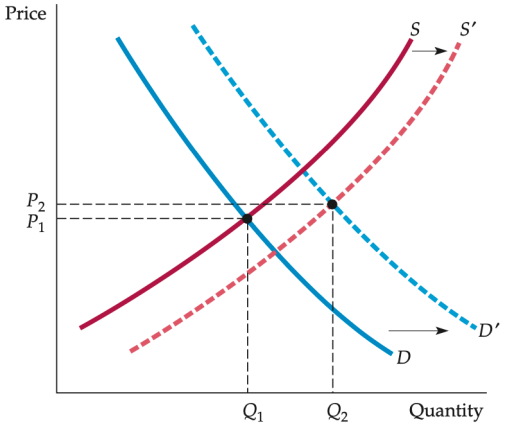

Source: *Microeconomics, 9th ed.* (Pindyck and Rubinfeld, 2018), Figure 2.6
New Equilibrium Following Shifts in Supply and Demand

- Raw material prices fall. $S \rightarrow S'$
- Income levels increase. $D \rightarrow D'$
- Equilibrium changes.

$$(P_1, Q_1) \rightarrow (P_2, Q_2)$$

- Demand shfts more than a shift of the supply, the equilibrium price increases.

$$P_1 < P_2, \ Q_1 < Q_2$$

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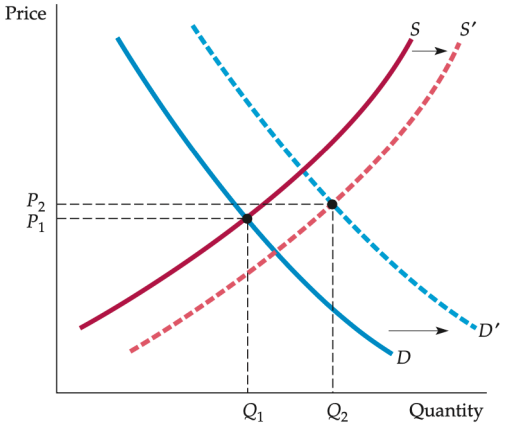

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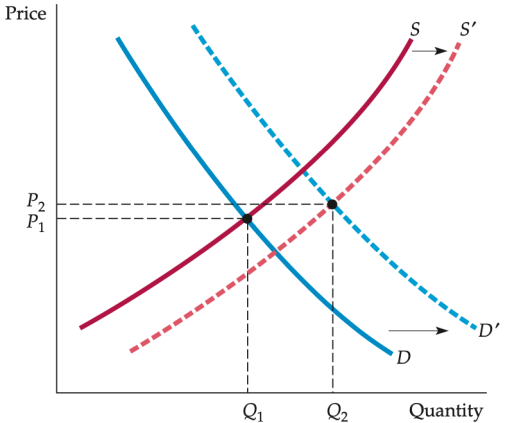

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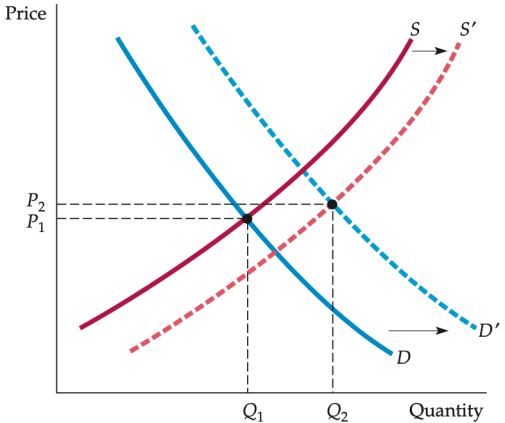

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Real World Example: Supply Shocks or Demand Shocks?

- In a competitive market,
  - Demand shock: P and Q move in the same direction along the supply curve.
  - Supply shock: P and Q move in the opposite direction along the demand curve.
- With this simple, elementary microeconomic intuition, Shapiro (2024, JMCB)
  - Decomposes inflation into supply and demand shocks
  - Uses the US monthly personal consumption expenditures (PCE) data
  - Distinguishes between items where price and volume move in the same direction (shifting D-curve or demand driven) and those where they move in opposite directions (shifting S-curve or supply driven).
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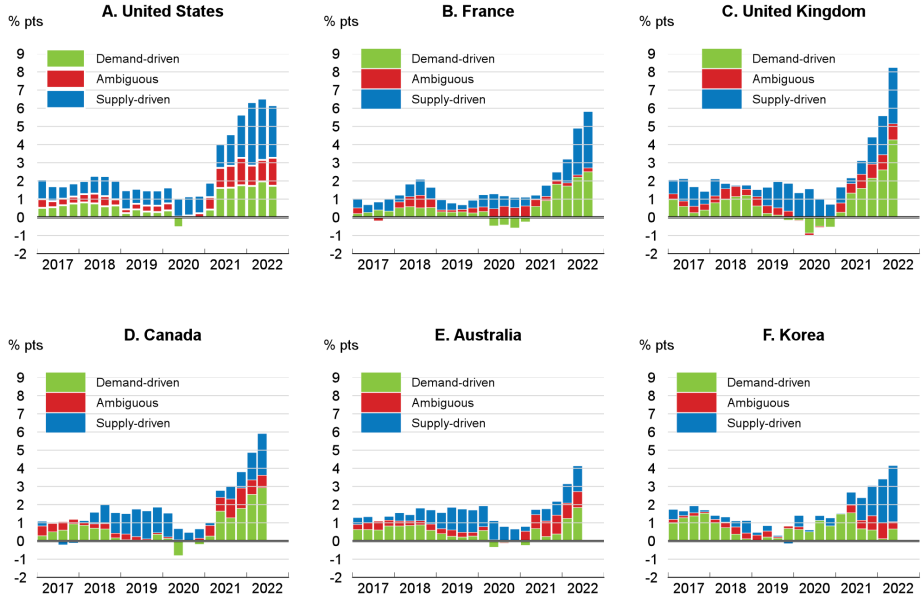

Source: *OECD Economic Outlook*, Nov 2022, Figure 1.4. Contributions of supply and demand driven inflation to headline inflation in selected OECD economies (Using the method developed by Shapiro, JMCB, 2024)

What Is Microeconomics?

An Overview: Supply, Demand, and Equilibrium

Elasticity

Elasticity (탄력성)

- When the supply increases or the supply curve shifts to the right,
  - Will the price fall more, or will the quantity increase more?
  - The steeper the demand curve, the smaller the change in the quantity demanded.
- The price elasticity of demand
  - Measures the sensitivity of quantity demanded to price changes.
  - Tells us what the percentage change in the quantity demanded of a good resulting from a 1-percent change in its price.

$$\|E_P\| = \left\| \frac{\%\text{ change in quantity demanded}}{\%\text{ change in price}} \right\|$$
$$= \left\| \frac{\Delta Q/Q}{\Delta P/P} \right\| = \left\| \frac{dQ}{dP}\frac{P}{Q} \right\| = \left\| \frac{d\log Q}{d\log P} \right\|$$

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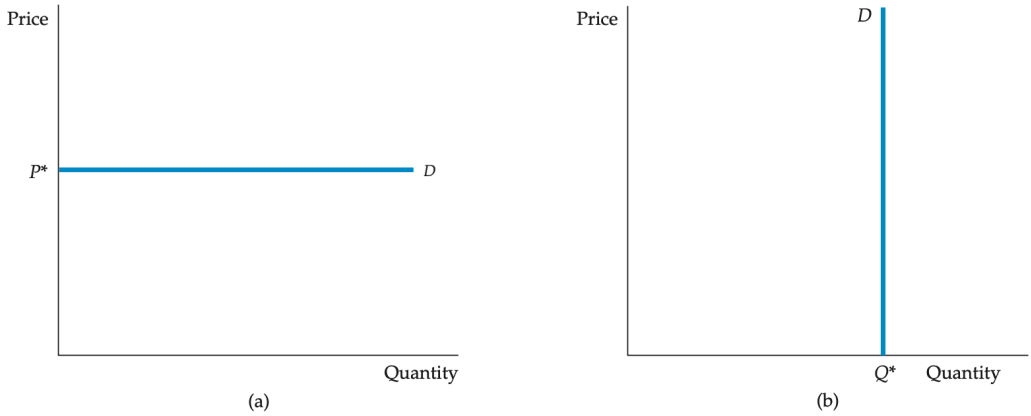
Price Elastic vs. Price Inelastic

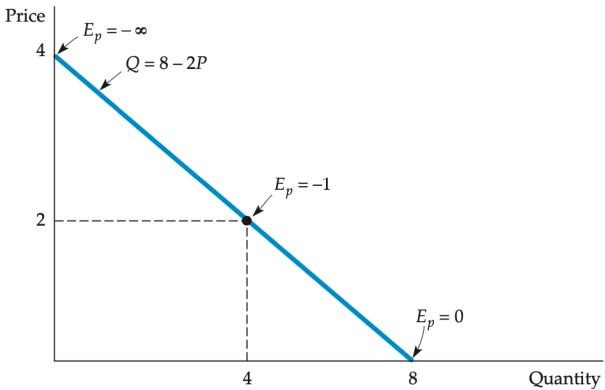


Source: *Microeconomics, 9th ed.* (Pindyck and Rubinfeld, 2018), Figure 2.12 (a) Infinitely elastic demand (b) completely inelastic demand

A Linear Demand Curve and the Price Elasticity of Demand

FIGURE 2.11
LINEAR DEMAND CURVE

The price elasticity of demand depends not only on the slope of the demand curve but also on the price and quantity. The elasticity, therefore, varies along the curve as price and quantity change. Slope is constant for this linear demand curve. Near the top, because price is high and quantity is small, the elasticity is large in magnitude. The elasticity becomes smaller as we move down the curve.



Source: *Microeconomics, 9th ed.* (Pindyck and Rubinfeld, 2018), Figure 2.11 Linear Demand Curve

Elasticities in Various Forms

- Elasticities of demand with respect to other variables besides price
  - Income elasticity of demand

$$E = \frac{\Delta Q/Q}{\Delta I/I} = \frac{d\log Q}{d\log I}$$

  - Cross-price elasticity of demand (+/- sign matters in this case)
    - Substitutes (대체재): Sulhyang vs. Gumshil strawberry

$$E = \frac{\Delta Q_S/Q_S}{\Delta P_G/P_G} = \frac{d\log Q_S}{d\log P_G} > 0$$

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- If we ask how much demand or supply changes in response to a change in price,
  - We must be clear about how much time is allowed to pass before we measure the changes in the quantity demanded or supplied.
- If we, as economists, observe changes within a narrow time window,
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  - We must be clear about how much time is allowed to pass before we measure the changes in the quantity demanded or supplied.
- If we, as economists, observe changes within a narrow time window,
  - we call it "short run"
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Real World Example: Elasticities of Gasoline and Automobiles

TABLE 2.1	DEMAND FOR GASOLINE				
	NUMBER OF YEARS ALLOWED TO PASS FOLLOWING A PRICE OR INCOME CHANGE				
ELASTICITY	1	2	3	5	10
Price	−0.2	−0.3	−0.4	−0.5	−0.8
Income	0.2	0.4	0.5	0.6	1.0

Source: *Microeconomics, 9th ed.* (Pindyck and Rubinfeld, 2018), Table 2.1 Demand for Gasoline

TABLE 2.2	DEMAND FOR AUTOMOBILES				
	NUMBER OF YEARS ALLOWED TO PASS FOLLOWING A PRICE OR INCOME CHANGE				
ELASTICITY	1	2	3	5	10
Price	−1.2	−0.9	−0.8	−0.6	−0.4
Income	3.0	2.3	1.9	1.4	1.0

Source: *Microeconomics, 9th ed.* (Pindyck and Rubinfeld, 2018), Table 2.2 Demand for Automobiles

- Consumers can purchase fuel-efficient cars.
- The price elasticity of gasoline is larger in the long run.
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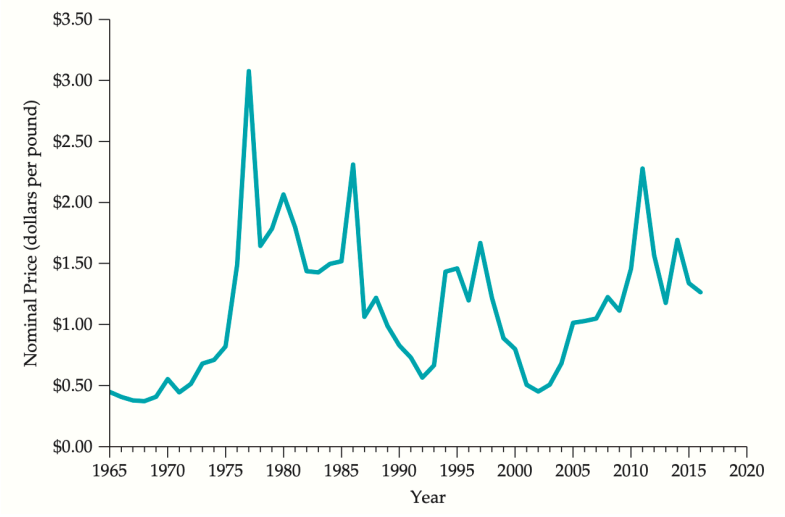
FIGURE 2.14
(a) GASOLINE: SHORT-RUN AND LONG-RUN DEMAND CURVES
(b) AUTOMOBILES: SHORT-RUN AND LONG-RUN DEMAND CURVES

(a) In the short run, an increase in price has only a small effect on the quantity of gasoline demanded. Motorists may drive less, but they will not change the kinds of cars they are driving overnight. In the longer run, however, because they will shift to smaller and more fuel-efficient cars, the effect of the price increase will be larger. Demand, therefore, is more elastic in the long run than in the short run. **(b)** The opposite is true for automobile demand. If price increases, consumers initially defer buying new cars; thus annual quantity demanded falls sharply. In the longer run, however, old cars wear out and must be replaced; thus annual quantity demanded picks up. Demand, therefore, is less elastic in the long run than in the short run.

Source: *Microeconomics, 9th ed.* (Pindyck and Rubinfeld, 2018), Table 2.2 Demand for Automobiles

Real World Example: Price of Coffee Beans



Source: *Microeconomics, 9th ed.* (Pindyck and Rubinfeld, 2018), Figure 2.18 Price of Brazilian Coffee

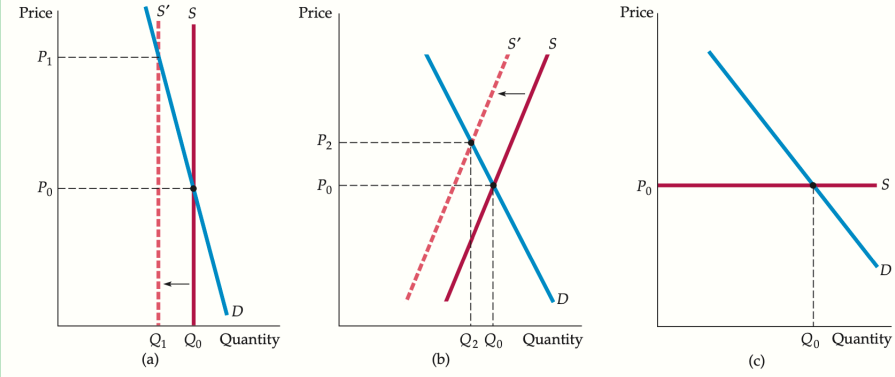


FIGURE 2.19
SUPPLY AND DEMAND FOR COFFEE

(a) A freeze or drought in Brazil causes the supply curve to shift to the left. In the short run, supply is completely inelastic; only a fixed number of coffee beans can be harvested. Demand is also relatively inelastic; consumers change their habits only slowly. As a result, the initial effect of the freeze is a sharp increase in price, from P_0 to P_1. **(b)** In the intermediate run, supply and demand are both more elastic; thus price falls part of the way back, to P_2. **(c)** In the long run, supply is extremely elastic; because new coffee trees will have had time to mature, the effect of the freeze will have disappeared. Price returns to P_0.

Source: *Microeconomics, 9th ed.* (Pindyck and Rubinfeld, 2018), Figure 2.19 Supply and Demand for Coffee