Microeconomics
Demand, Supply, Markets

Dr. P. J. Ram
The supply and demand model is a model of how a competitive market works.

Five key elements:

- Demand curve
- Supply curve
- Demand and supply curve shifts
- Market equilibrium
- Changes in the market equilibrium
A demand schedule shows how much of a good or service consumers will want to buy at different prices.

<table>
<thead>
<tr>
<th>Price of coffee</th>
<th>Quantity of coffee demanded</th>
</tr>
</thead>
<tbody>
<tr>
<td>$2.00</td>
<td>7.1</td>
</tr>
<tr>
<td>1.75</td>
<td>7.5</td>
</tr>
<tr>
<td>1.50</td>
<td>8.1</td>
</tr>
<tr>
<td>1.25</td>
<td>8.9</td>
</tr>
<tr>
<td>1.00</td>
<td>10.0</td>
</tr>
<tr>
<td>0.75</td>
<td>11.5</td>
</tr>
<tr>
<td>0.50</td>
<td>14.2</td>
</tr>
</tbody>
</table>
A demand curve is the graphical representation of the demand schedule. It shows how much of a good or service consumers want to buy at any given price. As price rises, the quantity demanded falls.
Change in Quantity Demanded vs Change in Demand

Simple Model

\[ Q_d = f(\text{Price}), \quad Q_d = f(\text{Price} \mid \text{other variables}) \]

Complex Model

\[ Q_d = f(\text{Price}, \text{other variables}) \]

other include Incomes, Price of Substitutes, Price of Complements, Advertising etc

\[ Q_{d \text{ Coffee}} = f(P_{\text{coffee}}, \text{Income}, P_{\text{Tea}}, \text{weather}, \text{Health News}, \text{Advertising}, \text{UPSC exams}) \]
Speculative Bubbles
Exception to Law of Demand

Speculative bubbles: the demand for houses increases, and increases sharply, even as prices soar. In fact, the rising prices are clearly a causal factor in the increased demand, because the increase in value, and the desire make money, is what attracts people.

Snob, Veblen Effects
Change in Quantity Demanded vs Change in Demand

\[ Q_d = f(\text{Price}), \quad Q_d = f(\text{Price} \mid \text{other variables}) \]

\[ Q_{d_{\text{Coffee}}} = f(P_{\text{coffee}}, \text{Income}, P_{\text{Tea}}, \text{weather}, \text{Health News}, \text{Advertising}, \text{UPSC exams}) \]

- **Change in Demand (Shift in the demand curve)**
- The demand curve will shift, move either inward or outward as a result of non-price factors. A shift in demand can be related to the factors other than its own price. A non-exhaustive list below:
  - Consumer preferences
  - Consumer income
  - Change in the price of related goods (i.e. compliments)
  - Change in the number of buyers
  - Consumer expectations
Change in Quantity Demanded vs Change in Demand

A movement along the demand curve is a change in the quantity demanded of a good that is the result of a change in that good's price.

A shift of the demand curve is not the same thing as a movement along the demand curve
The market demand curve is the *horizontal sum* of the individual demand curves of all consumers in that market.
Supply Schedule

- A supply schedule shows how much of a good or service would be supplied at different prices.

<table>
<thead>
<tr>
<th>Price of coffee</th>
<th>Quantity of coffee supplied</th>
</tr>
</thead>
<tbody>
<tr>
<td>$2.00</td>
<td>11.6</td>
</tr>
<tr>
<td>1.75</td>
<td>11.5</td>
</tr>
<tr>
<td>1.50</td>
<td>11.2</td>
</tr>
<tr>
<td>1.25</td>
<td>10.7</td>
</tr>
<tr>
<td>1.00</td>
<td>10.0</td>
</tr>
<tr>
<td>0.75</td>
<td>9.1</td>
</tr>
<tr>
<td>0.50</td>
<td>8.0</td>
</tr>
</tbody>
</table>
A supply curve shows graphically how much of a good or service people are willing to sell at any given price.

As price rises, the quantity supplied rises.
Change in Quantity Supplied vs Change in Supply

Supply Model

Simple Model

\[ Q_s = f(\text{Price}), \quad Q_s = f(\text{Price} \mid \text{other variables}) \]

Complex Model

\[ Q_s = f(\text{Price, other variables}) \]

other include Technology, Price of Inputs (Wages, Machinery etc), Weather, etc

\[ Q_{s\text{ Coffee}} = f(P_{\text{coffee}}, \text{Technology, Weather, Health News, Ag Labour Wages, Subsidies}) \]
A shift of the supply curve is a change in the quantity supplied of a good at any given price.

Technology adoption in coffee-growing business → more coffee producers
A movement along the supply curve is a change in the quantity supplied of a good that is the result of a change in that good’s price.
Any "increase in supply" means a rightward shift of the supply curve: at any given price, there is an increase in the quantity supplied. ($S_1 \rightarrow S_2$)

Any "decrease in supply" means a leftward shift of the supply curve: at any given price, there is a decrease in the quantity supplied. ($S_1 \rightarrow S_3$)
What Causes a Supply Curve to Shift?

- Changes in input prices
  - An *input* is a good that is used to produce another good.
- Changes in the prices of related goods and services
- Changes in technology
- Changes in expectations
- Changes in the number of producers
The market supply curve is the *horizontal sum* of the individual supply curves of all firms in that market.
Equilibrium in a competitive market: when the quantity demanded of a good equals the quantity supplied of that good.

The price at which this takes place is the equilibrium price (or market-clearing price).

- Every buyer finds a seller and vice versa.
- The quantity of the good bought and sold at that price is the equilibrium quantity.
Market equilibrium occurs at point $E$, where the supply curve and the demand curve intersect.
An increase in demand...Cold Weather + UPSC Exam leads to a movement along the supply curve due to a higher equilibrium price and higher equilibrium quantity.
Equilibrium and Shifts of the Supply Curve

Price rises... e.g. drought in coffee producing areas... leads to a movement along the demand curve

A decrease in supply... e.g. drought in coffee producing areas... leads to a movement along the demand curve

Price rises

Quantity falls

\( E_1 \)

\( E_2 \)

\( S_1 \)

\( S_2 \)

\( Q_1 \)

\( Q_2 \)
Simultaneous Shifts of Supply and Demand

We can make the following predictions about the outcome when the supply and demand curves shift simultaneously:

<table>
<thead>
<tr>
<th>Simultaneous Shifts of Supply and Demand</th>
<th>Supply Increases</th>
<th>Supply Decreases</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demand Increases</strong></td>
<td>Price: ambiguous Quantity: up</td>
<td>Price: up Quantity: ambiguous</td>
</tr>
<tr>
<td><strong>Demand Decreases</strong></td>
<td>Price: down Quantity: ambiguous</td>
<td>Price: ambiguous Quantity: down</td>
</tr>
</tbody>
</table>
Automobile Market

Let us consider a simple demand and supply model of Automobiles:

The supply curve embodies all production costs (labor costs, raw materials etc).

The equilibrium is \( e \) where price is \( P_1 \) and quantity is \( Q_1 \).

Now, we add an estimate of external costs associated environmental damage. This gives a new supply curve \( S' \).
Automobile Market with External Costs

**FIGURE 3-1** Automobile Market with External Costs
Automobile Market with Pollution Tax

**FIGURE 3-2 Automobile Market with Pollution Tax**
Automobile Market – Singapore Case

Singapore case. It is very expensive to own and drive a car in Singapore; the government has implemented a range of measures to manage car ownership and usage. These include the Certificate of Entitlement (COE), Vehicle Quota System (VQS), road taxes and Electronic Road Pricing (ERP). All motor vehicles must be registered with the Land Transport Authority.
Automobile Market – Singapore Case

Taking $20,000 as the Open Market Value.

<table>
<thead>
<tr>
<th>OMV</th>
<th>Custom Duty (20% OMV)</th>
<th>GST (3%)</th>
<th>ARF (130% OMV)</th>
<th>Registration Fees</th>
<th>Estimated Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>$20,000</td>
<td>$4,000</td>
<td>$1,200</td>
<td>$26,000</td>
<td>$140</td>
<td>$51,340</td>
</tr>
</tbody>
</table>

ARF: Additional Registration Fee

The above table is the calculation of your cost of your car when dealers import them into Singapore. (For simplicity, you could use 275% - before 4 May 2002 and 254% - effective 4 May 2002 of OMV as an estimate on the cost) Of course, you should also add the COE for that month onto this amount. i.e. if the COE is $30,000 then the car price will be $84,986.
India should promote Electric Cars.

www.greencarreports.com
Yasuní as the zone with the highest biodiversity of the world. Within one hectare of Yasuní, 644 different species of trees have been identified. There are as many different species in one hectare of Yasuní, as there are in the whole of North America.

- There are more species of ants in one tree than whole of England!
- Yasuní has been declared a world biosphere reserve by UNESCO.

Unfortunately the Yasuní also sits atop between 412 and 920 million barrels of oil

http://vimeo.com/1972062
Positive externalities

- This biosphere reserve is also the territory of the indigenous Huaorani people and some tribes who live in voluntary isolation. These are the last free human beings of Ecuador, true warriors who live in the so-called society of abundance, because they only produce the minimum to satisfy their own needs.

- The foreseeable impacts of oil exploitation in the park are: contamination, deforestation, destruction of the social fabric, extinction of cultures etc.
A Positive Externality

Marginal Costs and Marginal Benefits

Marginal Social Benefits

Marginal Private Benefits

Marginal Private Costs

Private Optimum

Social Optimum

$Q_p$, $Q_s$

Quantity of Rural Land (acres)

FIGURE 3-3 A Positive Externality
A Subsidy for Open and Rural Land Use

![Diagram of Marginal Costs and Benefits](image)

**FIGURE 3-4 A Subsidy for Open and Rural Land Use**
Models of the Australian Economy
Monash Model

- **VU-National**, a dynamic model of Australia, distinguishes up to 140 industries, 56 regions and 340 occupations. The model (formerly known as **MONASH**) is used to analyse the likely effects of changes in economic policy, especially changes in taxes, tariffs, environmental regulations and competition policy. VU-National is also used to produce labour market and income distribution forecasts.

- **MONASH** was a development of the ORANI model. Developed in the late 1970s, ORANI has been widely recognized as a significant contribution to economic methodology.

- Since 1993, the Centre of Policy Studies (CoPS) has developed **MONASH**, a dynamic computable general equilibrium (CGE) model of the Australian economy designed for forecasting and for policy analysis. Like its predecessor, ORANI, **MONASH** has a high level of microeconomic detail.
Microeconomics

- Perfect Competition
- Monopolistic Competition
- Oligopoly
- Monopoly
Perfect Competition

- A **price-taking producer** is a producer whose actions have no effect on the market price of the good it sells.

- A **price-taking consumer** is a consumer whose actions have no effect on the market price of the good he or she buys.

- A **perfectly competitive market** is a market in which all market participants are price-takers.

- A **perfectly competitive industry** is an industry in which producers are price-takers.
Two Necessary Conditions for Perfect Competition

1) For an industry to be perfectly competitive, it must contain many producers, none of whom have a large market share.
   - A producer’s market share is the fraction of the total industry output accounted for by that producer’s output.

2) An industry can be perfectly competitive only if consumers regard the products of all producers as equivalent.
   - A good is a standardized product, also known as a commodity, when consumers regard the products of different producers as the same good.
Free Entry and Exit

- There is free entry and exit into and from an industry when new producers can easily enter into or leave that industry.

- Free entry and exit ensure:
  - the number of producers in an industry can adjust to changing market conditions; and
  - producers in an industry cannot artificially keep other firms out.
Marginal Analysis Leads to Profit-Maximizing Quantity of Output

- The **price-taking firm’s optimal output rule** says that a price-taking firm’s profit is maximized by producing the quantity of output at which the marginal cost of the last unit produced is equal to the market price.

- The **marginal revenue curve** shows how marginal revenue varies as output varies.
The profit-maximizing point is where $MC$ crosses the $MR$ curve (horizontal line at the market price): at an output of 5 bushels of tomatoes (the output quantity at point $E$).
Profitability and the Market Price

The farm is profitable because price exceeds minimum average total cost, the break-even price, $14. The farm’s optimal output choice is $(E) \rightarrow \text{output of 5 bushels}$. The average total cost of producing bushels is $(Z \text{ on the } ATC \text{ curve}) \rightarrow $14.40.

The vertical distance between $E$ and $Z$: farm’s per unit profit, $18.00 - 14.40 = 3.60$
Total profit: $5 \times 3.60 = 18.00$
Monopoly

Our first departure from perfect competition…

- **A monopolist** is a firm that is the only producer of a good that has no close substitutes. An industry controlled by a monopolist is known as a **monopoly**, e.g. De Beers.

- The ability of a monopolist to raise its price above the competitive level by reducing output is known as **market power**.

- What do monopolists do with this market power? Let’s take a look at the following graph.
Monopoly
De Beers
Why Do Monopolies Exist?

• A **monopolist** has *market power*, and as a result will charge higher prices and produce less output than a competitive industry.
  - This generates profit for the monopolist in the short run and long run.

• Profits will not persist in the long run unless there is a **barrier to entry**. This can take the form of:
  - control of natural resources or inputs
  - increasing returns to scale (Natural Monopoly)
  - technological superiority
  - government-created barriers including patents and copyrights
Comparing Demand Curves

An individual perfectly competitive firm cannot affect the market price of the good → it faces a horizontal demand curve $D_C$, as shown in panel (a).

A monopolist, on the other hand, can affect the price (sole supplier in the industry) → its demand curve is the market demand curve, $D_M$, as shown in panel (b). To sell more output it must lower the price; by reducing output it raises the price.
The Monopolist’s Profit

Profit is given by the area of the shaded rectangle.

Profit = $TR - TC$

\[ = (P_M \times Q_M) - (ATC_M \times Q_M) \]

\[ = (P_M - ATC_M) \times Q_M \]

In this case, the $MC$ curve is upward sloping and the $ATC$ curve is U-shaped. The monopolist maximizes profit by producing the level of output at which $MR = MC$, given by point $A$, generating quantity $Q_M$. It finds its monopoly price, $P_M$, from the point on the demand curve directly above point $A$, point $B$ here.
Yugo and Amby

Introducing the same old idea. YUGO, $3990.
Panel (b) depicts the industry under monopoly: the monopolist decreases output to $Q_M$ and charges $P_M$. Consumer surplus (blue triangle) has shrunk because a portion of it has been captured as profit (light blue area). Total surplus falls: the deadweight loss (orange area) represents the value of mutually beneficial transactions that do not occur because of monopoly behavior.
Food monopolies and food sovereignty UnFair Shares
Race

The race for patents
Annual applications under World Intellectual Property Organization's Patent Co-operation Treaty (1,000s)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Applications</td>
<td>1</td>
<td>2</td>
<td>10</td>
<td>30</td>
<td>80</td>
</tr>
<tr>
<td>Patents granted</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td>15</td>
<td>30</td>
</tr>
</tbody>
</table>

Plant patents filed with WIPO during 1999

<table>
<thead>
<tr>
<th>Country</th>
<th>Applications</th>
<th>Patents granted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aotearoa/NZ</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>Australia</td>
<td>150</td>
<td>75</td>
</tr>
<tr>
<td>Britain</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td>Canada</td>
<td>250</td>
<td>125</td>
</tr>
<tr>
<td>US</td>
<td>300</td>
<td>150</td>
</tr>
</tbody>
</table>

Total US patents granted per year

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patents</td>
<td>1,500</td>
<td>2,000</td>
<td>3,000</td>
<td>4,000</td>
<td>5,000</td>
<td>6,000</td>
<td>7,000</td>
<td>8,000</td>
<td>9,000</td>
<td>10,000</td>
<td>11,000</td>
<td>12,000</td>
<td>13,000</td>
<td>14,000</td>
<td>15,000</td>
<td></td>
</tr>
</tbody>
</table>
### Some Stats of Big Pharma

#### Marketing Maladies

More than a third of pharmaceutical companies' resources go into promotion and marketing.

<table>
<thead>
<tr>
<th>Company</th>
<th>Marketing costs</th>
<th>Research and Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pfizer</td>
<td>$16.90 billion</td>
<td>$7.68 billion</td>
</tr>
<tr>
<td>GlaxoSmithKline</td>
<td>$12.93 billion</td>
<td>$5.20 billion</td>
</tr>
<tr>
<td>Sanofi-Aventis</td>
<td>$5.59 billion</td>
<td>$9.26 billion</td>
</tr>
<tr>
<td>Johnson &amp; Johnson</td>
<td>$15.86 billion</td>
<td>$5.20 billion</td>
</tr>
<tr>
<td>Merck</td>
<td>$7.35 billion</td>
<td>$4.01 billion</td>
</tr>
<tr>
<td>Novartis</td>
<td>$8.87 billion</td>
<td>$4.21 billion</td>
</tr>
<tr>
<td>AstraZeneca</td>
<td>$7.84 billion</td>
<td>$3.80 billion</td>
</tr>
<tr>
<td>Hoffman La Roche</td>
<td>$7.24 billion</td>
<td>$4.01 billion</td>
</tr>
<tr>
<td>Bristol-Myers Squibb</td>
<td>$6.43 billion</td>
<td>$2.50 billion</td>
</tr>
<tr>
<td>Wyeth</td>
<td>$5.80 billion</td>
<td>$2.46 billion</td>
</tr>
<tr>
<td>Abbott Labs</td>
<td>$4.92 billion</td>
<td>$1.70 billion</td>
</tr>
</tbody>
</table>
Agriculture biodiversity

Agricultural biodiversity, which is the basis for food production, is in sharp decline. It is estimated that about three-quarters of the genetic diversity found in agricultural crops have been lost over the last century, and this genetic erosion continues.

Today, only 150 crops feed most of the world's population, and just 12 crops provide 80 percent of dietary energy from plants, with rice, wheat, maize, and potato alone providing almost 60 percent.

Eg., varieties of rice
Agriculture biodiversity

Eg., varieties of rice
unFair Trade

Cases:
Bananas are one of the most important foods for both consumption and trade. They are the fourth most important staple food in the world and the fifth most traded agricultural commodity (after cereals, sugar, coffee and cocoa), generating billions of dollars.

Overall, an average of 4% of revenue returns to producing countries.

In the banana industry, production, profits, and power are highly concentrated. Just five corporations control around 85% of the world banana market.
Shrinking numbers of wild bananas in India, the world's premier producer, are causing concern at the United Nations Food and Agriculture Organization.

India's lost bananas include a variety which conferred genetic resistance to the dreaded black Sigatoka fungus disease that devastated plantations in the Amazon and elsewhere. Only one clone of the species, whose scientific name is Musa Acuminata spp Burmannicoides, remains at the Indian Botanic Gardens in Calcutta.
Patent on Life

- Patents have made collective resources – plants, animal varieties, our very genes – the property of private companies.

- Industrial countries own 97% of the world’s patents – but it’s the developing countries that account for 90% of the world’s biological resources on which many of the patents depend.
Patent on Life-Biopiracy

African cases

Thousands of patents on African plants have been filed. To name just a few:

- **brazzeine**, a protein 500 times sweeter than sugar from a plant in Gabon;
- **teff**, the grain used in Ethiopia’s flat "injera" bread;
- **thaumatin**, a natural sweetener from a plant in West Africa;
- the **African soap berry** and the **Kunde Zulu cowpea**;
- genetic material from the **west African cocoa plant**.
India has been translating ancient manuscripts containing old remedies over to computers, partially to prevent biopiracy. The texts are being recorded from Sanskrit, Urdu, Persian and Arabic; they will be made available to patent offices in English, German, French, Japanese and Spanish in 2006. The aim is to protect India's heritage from being exploited by foreign companies.
Maggi case

- Permissible limit?
- Cocktail effect