Perfect Competition and Pure Monopoly
<table>
<thead>
<tr>
<th>Market Structure</th>
<th>No. firms</th>
<th>Freedom of entry</th>
<th>Type of product</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perfect competition</td>
<td>Many</td>
<td>Very easy (or costless)</td>
<td>Homogeneous</td>
<td>Wheat, computers, gold</td>
</tr>
<tr>
<td>Pure monopoly</td>
<td>One</td>
<td>Barred (or prohibitively costly)</td>
<td>Single-product</td>
<td>Public utilities, Postal service</td>
</tr>
<tr>
<td>Monopolistic competition</td>
<td>Many</td>
<td>Relatively easy</td>
<td>Differentiated</td>
<td>Pens, books, paper, clothing</td>
</tr>
<tr>
<td>Oligopoly</td>
<td>Few</td>
<td>Difficult</td>
<td>Either standardized or differentiated</td>
<td>Steel, light bulbs, cereals, autos</td>
</tr>
</tbody>
</table>
• Perfect competition

Characteristics of a perfectly competitive market:

• Many buyers and sellers
  so no individual believes that their own action can affect market price

• Firms take price as given
  so each firm faces a horizontal demand curve

• The product is homogeneous

• Perfect customer information

• Free entry and exit of firms
• The perfect competitor’s price is determined by market supply and demand (panel (a)). As long as marginal revenue (MR), which equals market price, exceeds marginal cost (MC), the perfect competitor will expand production (panel (b)).

• The profit maximizing production level is the point at which marginal cost equals marginal revenue (price).
• Above price $P_3$ (point C), the firm makes profit above the opportunity cost of capital in the short run

• At price $P_3$ (point C), the firm makes NORMAL PROFITS

• Between $P_1$ and $P_3$ (A and C), the firm makes short-run losses, but remains in the market

• Below $P_1$ (the SHUT-DOWN PRICE), the firm fails to cover SAVC, and exits

• So the SMC curve above SAVC represents the firm’s SHORT-RUN SUPPLY CURVE (showing how much the firm would produce at each price level.)

• The industry supply curve is the sum of the individual firm’s supply curves.
• The firm and the market in the short run under perfect competition

If the market demand rises from $D_1$ to $D_3$ (panel (a)), the price will rise with it, from $P_1$ to $P_3$.

As a result, the perfectly competitive firm’s demand curve will rise, from $d_1$ to $d_3$ (panel (b)).
The perfect competitor’s demand curve is established by the market clearing price (panel (a)).

The profit maximizing perfect competitor will extend production up to the point at which marginal cost equals marginal revenue (price), or point a in panel (b). At that output level – \( q_2 \) – the firm will earn a short-run economic profit equal to the shaded area \( ATC_1P_1ab \).

If the perfect competitor were to minimize average total cost, it would produce only \( q_1 \), losing profits equal to the darker shaded area dca in the process.
The market clearing price (panel (a)) establishes the firm’s demand curve (panel (b)). Because the price is below the average total cost curve, this firm is losing money. As long as the price is above the low point of the average variable cost curve, however, the firm should minimize its short-run losses by continuing to produce where marginal cost equals marginal revenue (price or point b in panel (b)). This perfect competitor should produce $q_1$ units, incurring losses equal to the shaded area $P_1ATC_1ab$. (The alternative would be to shut down, in which case the firm would lose all its fixed costs.)
The long-run effects of short-run profits

If perfect competitors are making short-run profits, other producers will enter the market, increasing the market supply and lowering the market price. The individual firm’s demand curve will shift down. The firm will reduce its output from \( q_2 \) to \( q_1 \). Long-run equilibrium will be achieved when the price falls to the low point of the firm’s average total cost curve, eliminating economic profit.
The long-run effects of short-run losses

If perfect competitors are suffering short-run losses, some firms will leave the industry, causing the market supply to shift back from $S_1$ to $S_2$ and the price to rise, from $P_1$ to $P_2$ (panel (a)).

The individual firm’s demand curve will shift up with price, from $d_1$ to $d_2$ (panel (b)). The firm will expand from $q_1$ to $q_2$, and equilibrium will be reached when price equals the low point of average total cost $P_2$, eliminating the firm’s short-run losses.
• **The long-run effects of economies of scale**

If the market is in equilibrium at price $P_2$ and the individual firm is producing $q_1$ on SR, firms will be just breaking even. Because of the profit potential represented by the shaded area, firms can be expected to expand production to $q_3$, where the LRMC curve intersects the demand curve ($d_1$).

As they expand production to take advantage of economies of scale, however, supply will expand from $S_1$ to $S_2$, pushing the market price down toward $P_1$, the low point of the long-run average total cost curve (LRATC in panel (b)). Economic profit will fall to zero. Because of rising diseconomies of scale, firms will not expand further.
The efficiency of the competitive market

(a) Market

(b) Firm X

(c) Firm Y

Price per computer chip

Quantity of computer chips

Price per computer chip

Quantity of computer chips

Price per computer chip

Quantity of computer chips

$P_1$

$Q_1$

$P_1$

$q_x$

$q_y$

$MC_x$

$ATC_x$

$MC_y$

$ATC_y$

$d_x$

$d_y$
• **Moving toward the equilibrium**

Markets do not always move smoothly toward equilibrium. If current production decisions are based on past prices, price may adjust to supply in the “cobweb pattern” shown here.

![Cobweb Diagram]

Having received price $P_1$ in the past, farmers will plan to supply only $Q_1$ bushels of wheat. That amount will not meet market demand, so the price will rise to $P_4$ – inducing farmers to plan for a harvest of $Q_3$ bushels. At price $P_4$, however, $Q_3$ bushels will not clear the market; ... Only after several tries do many farmers find the equilibrium price–quantity combination.
• Monopoly

A monopolist:

• is the sole supplier of an industry’s product
• ... and the only potential supplier
• is protected by some form of barrier to entry
• faces the market demand curve directly
• Unlike under perfect competition, MR is always below AR.
• The monopolist’s demand and marginal revenue curves

The demand curve facing a monopolist slopes downward, it is the same as market demand.

The monopolist’s marginal revenue curve is constructed from the information contained in the demand curve.

![Graph showing demand (D) and marginal revenue (MR) curves]

<table>
<thead>
<tr>
<th>Table 11.1 The monopolist’s declining marginal revenue</th>
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<tbody>
<tr>
<td>Quantity of yo-yos sold</td>
</tr>
<tr>
<td>-------------------------</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
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</table>
The monopolist will move toward production level $Q_2$, the level at which marginal cost equals marginal revenue.

At production levels below $Q_2$, marginal revenue will exceed marginal cost; the monopolist will miss the chance to increase profits.

At production levels greater than $Q_2$, marginal cost will exceed marginal revenue; the monopolist will lose money on the extra units.
- **Profit maximisation by a monopolist**

  The profit maximizing monopolist will produce at the level defined by the intersection of the marginal cost and marginal revenue curves: \( Q_1 \).

  It will charge a price of \( P_1 \) – as high as market demand will bear – for that quantity.

  Because the average total cost of producing \( Q_1 \) units is \( ATC_1 \), the firm’s profit is the shaded area \( ATC_1P_1ab \).
• **The monopolist’s short-run Losses**

Not all monopolists make a profit.

With a demand curve that lies below its average total cost curve, this monopoly will minimize its short-run losses by continuing to produce at the point where marginal cost equals marginal revenue ($Q_1$ units).

It will charge $P_1$, a price that covers its fixed costs, and will sustain short-run losses equal to the shaded area $P_1ATC_1ab$. 
• Monopolistic production over the long run

In the long run, the monopolist will produce at the intersection of the MR and LRMC. In contrast to the perfect competitor, the monopolist does not have to minimize LRAC by expanding its scale of operation. Three different scenarios are shown here.
The welfare comparison of monopoly and competition

Firms in a competitive market tend to produce at point $b$, and monopolist tends to produce at point $c$.

In a competitive market, therefore, the price will tend to be lower ($P_c$) and the quantity produced greater ($Q_c$) than in a monopolistic market.

The inefficiency of monopoly (dead-weight loss) is shown by the shaded triangular area abc, the amount by which the benefits of producing $Q_c - Q_m$ units (shown by the demand curve) exceed their marginal cost of production.
So we see that monopoly compared with perfect competition implies:

- higher price
- lower output

Does the consumer always lose from monopoly?

- Among other things, this depends on whether the monopolist faces the same cost structure;
- There may be the possibility of economies of scale (natural monopoly).

Note:

- Since the monopolist decides on the level of production based on the demand he faces, then there is no interpretation for supply (supply curve) in a monopolistic market.
The effect of price controls on the monopolist’s decision

In an unregulated market, a monopolistic utility will produce $Q_m$ kilowatts and sell them for $P_m$. If the firm’s price is controlled at $P_1$, however, its marginal revenue curve will become horizontal at $P_1$. The firm will produce $Q_1$ – more than the amount it would normally produce. The firm is even happy to produce more which there is no demand for.
- **Taxing monopoly profits**

  As usual a fixed tax has no effect on the $MC$ and in some cases monopolistic profit is subject to a lump-sum tax. The only tax which has an effect on the level of production is a tax for every unit of production.

  A tax shifts the first marginal cost curve up, from $MC_1$ to $MC_2$, raising the price to the consumer and lowering the production level.
Construction of the nonlinear marginal revenue curve

The marginal revenue curve for a nonlinear demand curve is obtained by imagining linear demand curves tangent to every point on the nonlinear demand curve and finding the correspondence marginal revenue point for this linear demand curves.

Mathematically it is easy to work out the expression for the MR.
• **Natural monopoly**

  ![Diagram of natural monopoly]

  - This firm enjoys substantial economies of scale relative to market demand
  - LAC declines right up to market demand
  - the largest firm always enjoys cost leadership
  - and comes to dominate the industry
  - It is a NATURAL MONOPOLY.
A natural monopolist that cannot price discriminate will produce only $Q_1$ – less than $Q_2$, the efficient output level – and will charge a price of $P_1$. If the firm tries to produce $Q_2$, it will make losses equal to the shaded area, for its price ($P_2$) will not cover its average cost ($AC_1$).
If a natural monopoly is compensated for the losses it incurs in operating at the efficient output level (the shaded area $P_1ATC_1ba$), it may monitor its costs less carefully. Its cost curves may shift up, from $LRMC_1$ to $LRMC_2$ and from $LRAC_1$ to $LRAC_2$.

Regulators will then have to raise the price from $P_1$ to $P_2$, and production will fall from $Q_1$ to $Q_2$. The firm will still have to be subsidized (by an amount equal to the shaded area $P_2ATC_2dc$), and the consumer will be paying more for less.
• An Example

Suppose a monopolist faces a demand of the form \( Q = 100 - 2P \) and has a cost function of \( C = 20 + \frac{1}{2} Q^2 \). Calculate the level at which monopolist decides to produce and monopolistic price and profit.

Evaluate the welfare generated by this market.

How the result was different if the market was a competitive one.
• Price discrimination

Charging different customers different prices.

When a monopolist is able to discriminate between its customers?

• The monopolist needs to have some information about each individual’s (or a subset) taste/preferences
• The product cannot be resold in the market
By offering customers one can of beans for $0.30, two cans for $0.55, and three cans for $0.75, a grocery store collects more revenues than if it offers three cans for $0.20 each. In either case, the consumer buys three cans. But by making the special offer, the store earns $0.15 more in revenues per customer.
• First-Degree (Perfect) Price discrimination

Charges every customer, her highest willingness to pay. (MR = D; the extra sale does not affect negatively the revenue)

The perfect price-discriminating monopolist will produce at the point where marginal cost and marginal revenue are equal (point a). Its output level, $Q_c$ is therefore the same as that achieved under perfect competition. But because the monopolist charges as much as the market will bear for each unit, its profits – the shaded area $\text{ATC}_1P_1ab$ – are higher than the competitive firm’s.
Third-Degree Price discrimination

The monopolist cannot perfectly recognise every customer but is able to identify some characteristics of the individuals and subject the price to those characteristics.

For example offering students special discount on bus fares.

The monopolist that cannot perfectly price-discriminate may elect to charge a few different prices by segmenting its market. To do so, it divides its market by income, location, or some other factor and finds the demand and marginal revenue curves in each.
It adds those marginal revenue curves horizontally to obtain its combined marginal revenue curve for all market segments, \( MR_m \) (panel (c)). By equating marginal revenue with marginal cost, it selects its output level, \( Q_m \). Then it divides that quantity between the two market segments by equating the marginal cost of the last unit produced (panel (c)) with marginal revenue in each market (panels (a) and (b)). It sells \( Q_a \) in market A and \( Q_b \) in market B, and charges different prices in each segment. Generally, the price will be higher in the market segment with the less elastic demand (panel (b)).
• **Second-Degree Price discrimination**

Seller is not able to differentiate between different types of consumers. Thus, the monopolist will provide incentives for the consumers to differentiate themselves according to preference. Quantity "discounts", or non-linear pricing, is a means by which suppliers use consumer preference to distinguish classes of consumers. This allows the supplier to set different prices to the different groups and capture a larger portion of the total market surplus.

• Price discrimination is usually illegal; but can it can improve the welfare in some cases. For example when as a result of discrimination a sub-segment of population are served which won’t be served without discrimination.