AE 503

MONOPOLY

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Monopoly Equilibrium - Linear Demand Case

Suppose demand is:

\[ p = a - by \]  \hspace{1cm} (1)

where \( a \) is the demand curve intercept, and \( b \) is its slope

Revenue \( r \) is then:

\[ r = py = ay - by^2 \]  \hspace{1cm} (2)

Differentiating this with respect to \( y \) gives marginal revenue:

\[ MR = a - 2by \]  \hspace{1cm} (3)

i.e. the marginal revenue curve has the same intercept as the demand curve, but has a slope that is twice as steep, \( 2b \)

(See next figure)
Monopoly equilibrium is at output $y^*$, where marginal revenue = marginal cost

Total revenue, $p^*y^* = \text{area } (0 \ p^*dy^*)$

Total cost, $cy^* = \text{area } (0fey^*)$

Monopoly profit = area $(p^*fed)$
Why is Monopoly Inefficient?

Compared to competition, monopoly results in lower output, and a higher price. Consumers are worse off than under competition, but the firm is better off. So what are the efficiency arguments against monopoly?

Looking at next figure:

- the competitive firm would set output at $y_c$, with a price of $p_c$, where price is equal to marginal cost

- monopolist goes to $y_m$, with a price of $p_m$

Is the monopoly equilibrium one where somebody can be made better off, without making anyone worse off?
Along demand curve, price measures how much consumers are willing to pay for an extra unit of the good.

Between f and g, there is a range of output where some consumers are willing to pay more than the cost of producing it, i.e. there is room for a Pareto improvement.

Why does inefficiency occur?

- Monopolist takes account of the effect of an increase in output on the revenue it receives from those units it is already selling, i.e. inframarginal units.

- If output is increased by one unit, price of current units sold falls, lowering monopolist’s profits.

- If price of current units sold did not have to fall, monopolist would produce up to the efficient point, where the last unit sold has a price equal to marginal cost.

- Monopolist would set a specific price for each unit of good sold - *perfect price discrimination*. 
How is the inefficiency of monopoly measured?

- Consumer loss measured by consumer surplus.
- Firm’s gain measured by producer surplus.

Difference between these gives a measure of net benefit/cost of monopoly (See next figure).

If price is lowered from monopoly level $p^m$:

- Producer surplus falls by area $A$, a lower price being received on current units sold.

- Producer surplus goes up by area $D$, which is surplus earned on extra units sold.

- Monopolist continues to earn area $B$.

- Consumer surplus increases by area $A$, as they get $y^m$ at the lower price $p^c$.

- Consumer surplus increases by area $C$, extra units being consumed.
Area $A$ is a transfer from monopolist to consumer, so consumer is better off, firm worse off, but total surplus of $(A+B)$ has not changed.

Area $(C+D)$ is an increase in surplus, i.e. the value that consumers and the firm place on the extra output.

Area $(C+D)$ is known as the deadweight loss from monopoly, providing a measure of how much worse off people are by paying the monopoly price.

It measures the value of lost output, by valuing each unit of lost output at the price people are willing to pay for that unit.