Princples of Microeconomics-II
L1: Monopoly
August - December 2025

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A Monopoly Firm

Monopoly

A monopoly firm is the *sole seller* of a product that has *no close substitutes*.

- Barriers to entry
- Only marketing exclusivity $\neq$ monopoly!
- How can monopolies form? IPR! M&A! Regulation! Driving out competition!

Barriers to Entry

1. Monopoly resource ownership (often spatially limited!)
2. Government-created monopolies (IRCTC, HAL, IPR environment: vaccine production!)
3. Natural monopolies (IGL, water supply)

More on Natural Monopolies

- Think back to the shape + components of the ATC curve!
- Very high FC component
- New entry is unattractive

Natural Monopoly

A natural monopoly arises when a single firm can supply a good or service to an entire market at a lower cost than could two or more firms. Given any amount of output, two or more firms leads to:

1. Lesser output per firm;
2. Higher ATC

Monopoly Optimisation

So, a monopoly has complete market power over a product that has no substitutes. How can a monopoly, then, price its product? Can it charge a theoretically ∞-ly high price?

What is the constraint for a profit-maximising monopoly?

Monopoly Optimisation

The monopolist's optimisation problem is:

$$max_Q \; P(Q)Q - C(Q) \tag{1}$$

Here, the decision of what quantity to produce = the decision of what price to set to produce that quantity.

- What is TR? P(Q)Q
- What is AR? P(Q)
- What is MR? $\frac{\Delta TR}{\Delta Q}$ Go back to the revenue example done in the Review class! Can MR be negative?
- What was the relationship between MR and AR/P?
- When a monopoly sells more, Q ↑ so TR ↑. At the same time, P ↓ to TR ↓.

Monopoly Optimisation

- The monopolist will maximise profits when MR = MC. Intuition!
- What is Q*? What is the corresponding price P*?
- How is the optimal point different from a perfectly competitive firm?
- Equilibrium profit: $TR(Q^*) - TC(Q^*) \iff (\frac{TR(Q^*)}{Q^*} - \frac{TC(Q^*)}{Q^*}) \times Q^* \iff (P - ATC) \times Q^*$.
- Recall: Relationship between ATC and MC!

Homework: Does a monopoly have a supply curve? If yes, what is the supply curve of a monopolist? Less than 100 words, due Saturday, 23 August 2025.

Aside: FOC $\implies$ P(Q) + QP'(Q) - C'(Q) = 0

Monopoly Optimisation

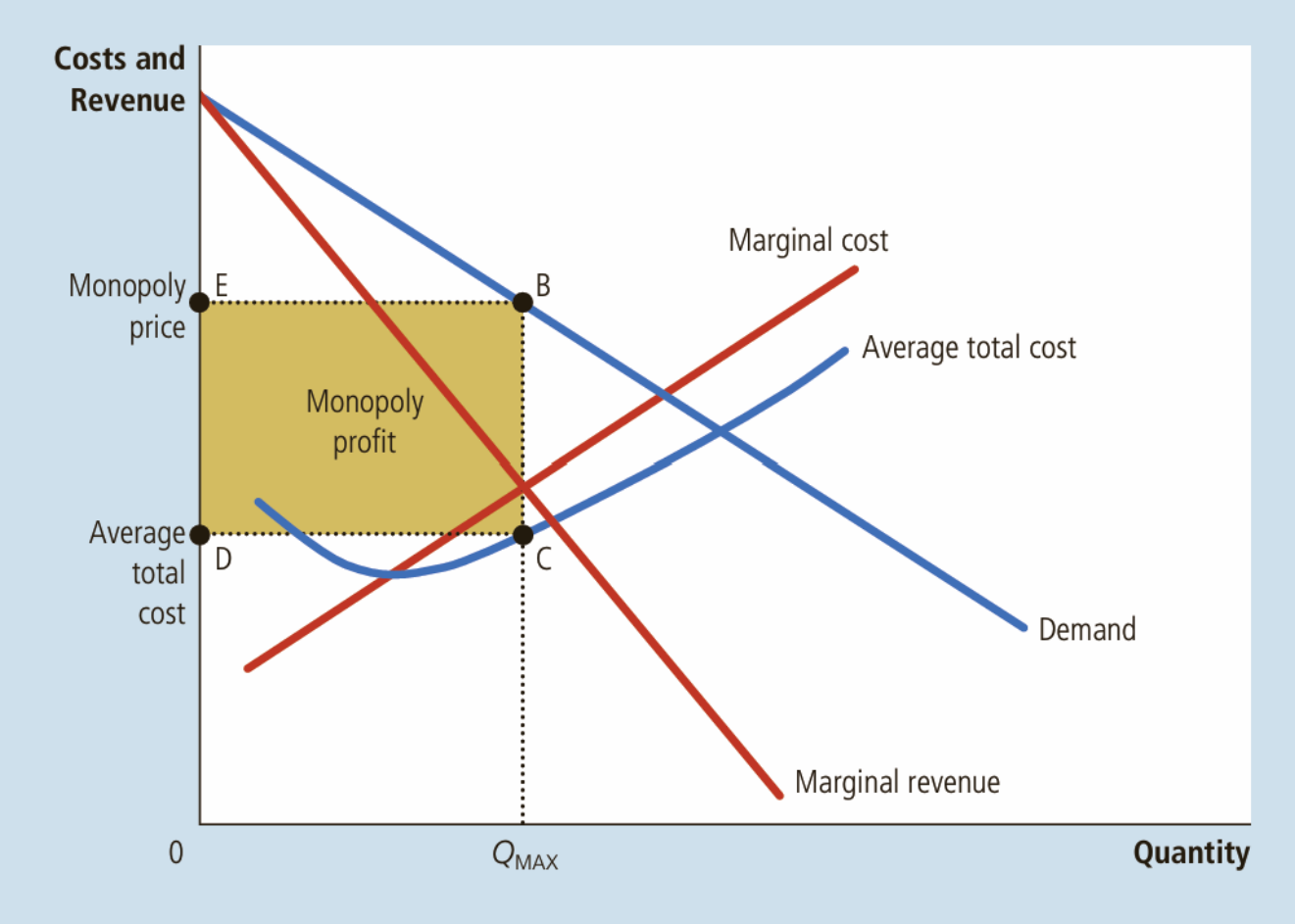

Figure: The Monopolist's Profit. *Source:* Chapter 15, Mankiw (2018)

Welfare Analysis

What is welfare? Think in terms of agents' objective functions!
Components of Welfare:

1. Profit
2. Consumer Surplus
3. Government Revenue
4. Non-marketed costs and

First-best outcomes maximise social surplus. In this context, social surplus = 1 + 2.

Welfare Analysis: The Social Optimal

- In a *perfectly competitive* market, why is P = MC optimal?
- P: Value to consumer (think area under the demand curve)
- MC: Cost to producer, in this case the monopolist (think area under the MC curve)
- Logical inference: Social Optimal when P = MC (irrespective of the degree of concentration of market power).

Does the monopolist's optimisation problem reach this outcome?

Welfare Analysis: The Social Optimal

- $Q^*_{max} < \hat{Q}_{opt}$
- $\forall\ P \in [\hat{P}_{opt}, P^*_{max})$ the price consumers are willing to pay $>$ the marginal cost of providing the commodity
- Deadweight loss!

Welfare Analysis: Deadweight Loss

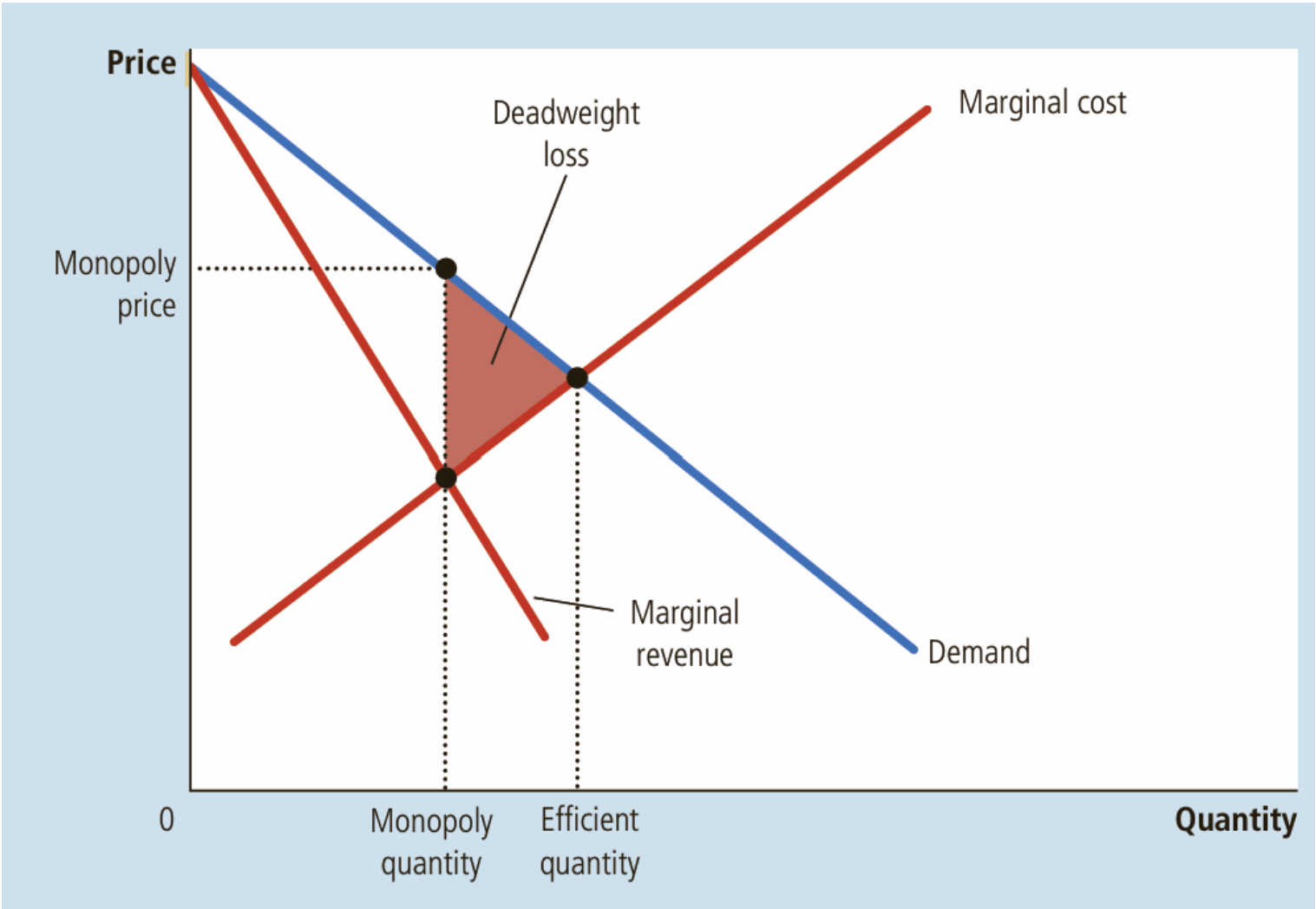

Figure: Monopoly Deadweight Loss. *Source:* Chapter 15, Mankiw (2018)

Why the Deadweight Loss?

- Recall: each point on the demand curve $\implies$ willingness (& ability) to pay a price for a corresponding quantity
- Recall: DWL & willingness to pay

This is because the demand curve is downward sloping & and the monopolist sets one price.

Price Discrimination

What if the monopolist could charge more than one price for the same commodity on the basis of different willingness-to-pay values?

1. A rational strategy;
2. No arbitrage possibilities;
3. Welfare improving.

Homework: Think of two examples of price discrimination, and note them down. Due Saturday, 23 August 2025.

Perfect (First-Degree) Price Discrimination

A non-trivial assumption: The monopolist has perfect information about each consumer's willingness to pay.
Assume: Constant marginal cost (for the purpose of illustration).

Perfect Price Discrimination

A monopolist practicing perfect price discrimination charges from each consumer her willingness to pay. The entire consumer surplus accrues to the monopolist as profit.

Since knowing willingness-to-pay is not straightforward, monopolists often use different kinds of price discrimination to elicit this information (for e.g., two-part tariffs, market segmentation, bulk purchase discounts).

Perfect (First-Degree) Price Discrimination

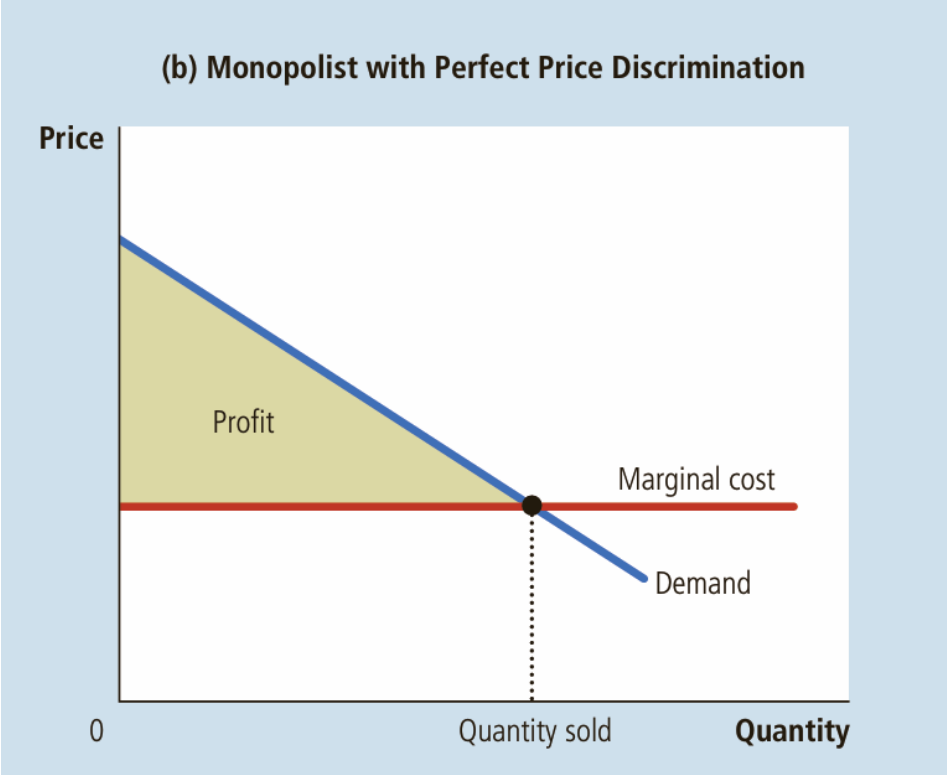

Figure: Monopolist practicing perfect price discrimination. *Source:* Chapter 15, Mankiw (2018)

Regulation

Why might we want to regulate monopolies?

1. Inefficiencies
2. Prohibitive pricing
3. Control over markets for inputs
4. Concentration of economic and thus, political power

Recall: The MRTP (1969) and subsequent setting up of the CCI.

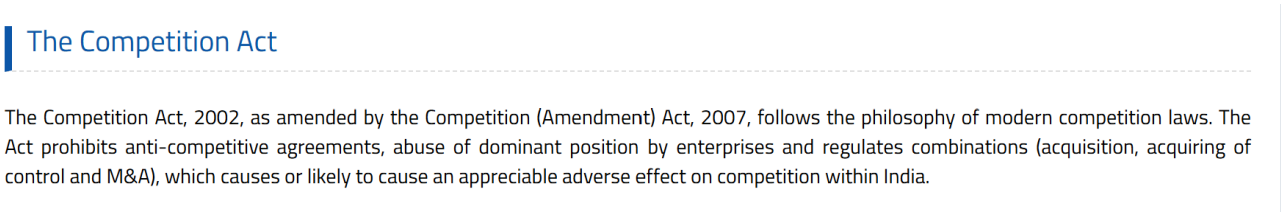

Figure: The Competition Commission of India, instituted to enact the provisions of the Competition Act, 2002

Regulation

Four ways in which public policy can act towards monopolies:

1. Antitrust laws to increase competition
2. Price Regulation (*)
3. Public Ownership
4. Do nothing!

*Can a government regulate a natural monopoly by setting their price equal to marginal cost?

Tutorial Assignment

Problems and Applications (1-12) on Page 314 of the 8^{th} edition of Mankiw (2018).

Appendix 1 (Optional)

A mathematical proof for Problem 5.

Proof: A monopolist will never operate on the inelastic portion of the demand curve.

Price elasticity of demand is inelastic

$$\implies \epsilon_d^p = \frac{\delta Q}{\delta P(Q)} \cdot \frac{P(Q)}{Q} > -1$$
$$\implies \frac{\delta P(Q)}{\delta Q} \cdot \frac{Q}{P(Q)} < -1$$
$$\implies \frac{\delta P(Q)}{\delta Q} \cdot Q < -P(Q)$$
$$\implies \frac{\delta P(Q)}{\delta Q} \cdot Q + P(Q) < 0$$
$$\implies \frac{\delta}{\delta Q}(P(Q) \cdot Q) < 0$$
$$\implies \text{Marginal Revenue is negative.}$$