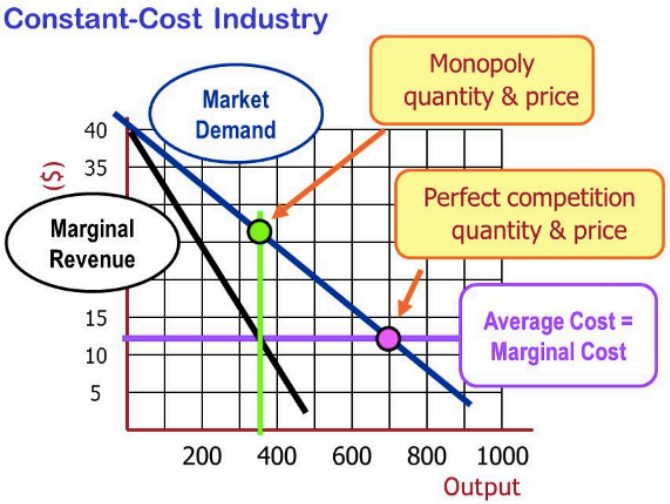
ECONOMICS Lecture 16
Market Structure & Firm's Decision

Biwei Chen

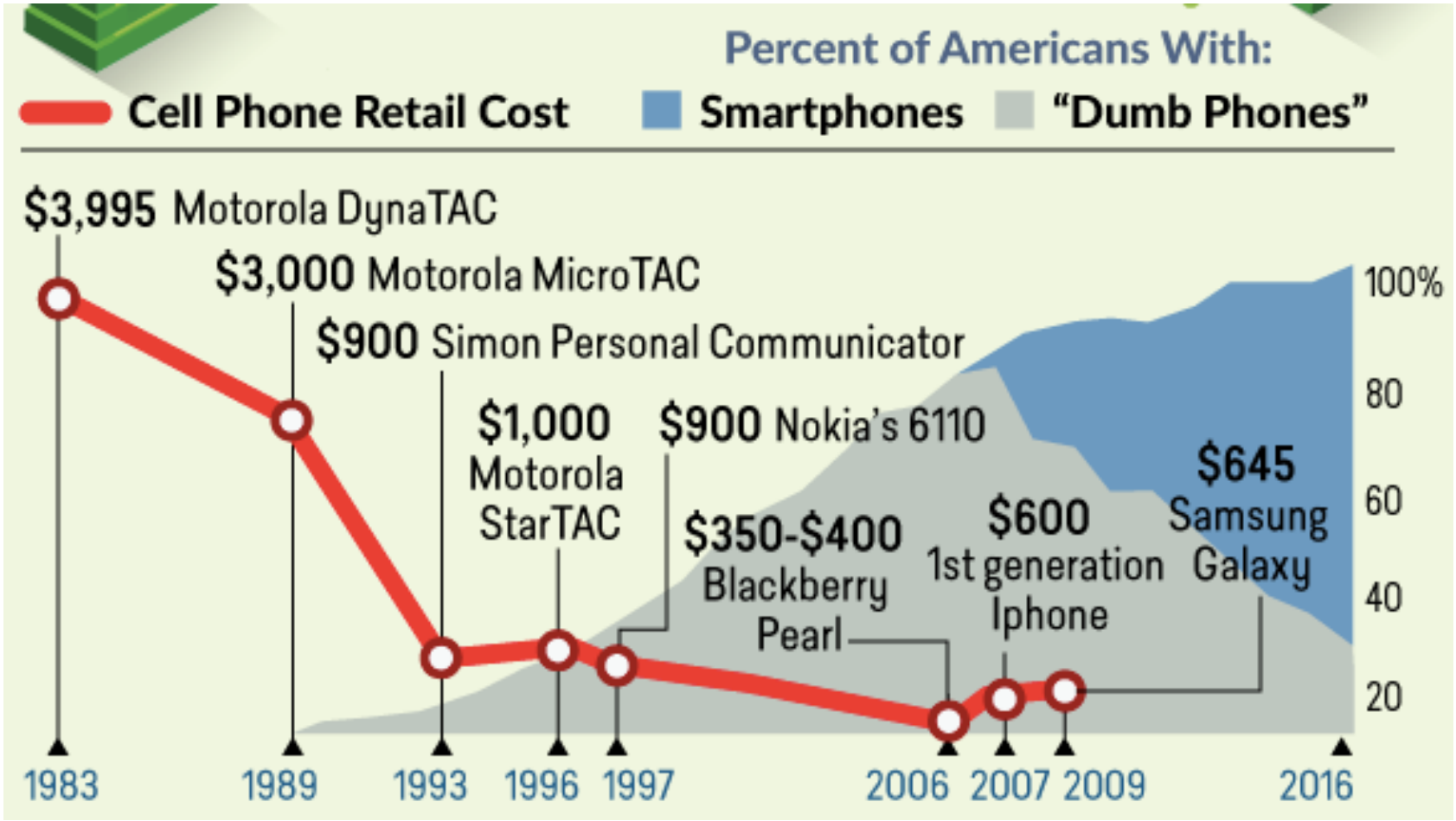
Topics

- Firm's Decisions
- Perfect Competition
- Monopoly Decision
- Market Structure



This lecture places firms as trees in the forest, models how firms operating in different market structure make short-run and long-run decisions, discusses the nature of market competition, its welfare implications, and monopoly pricing strategies.

Evolution of Cellphone Industry



1960s-1980s: Motorola Leads the Industry

1990s: Cell Phones Become Affordable

2000s: Smartphones Are Developed

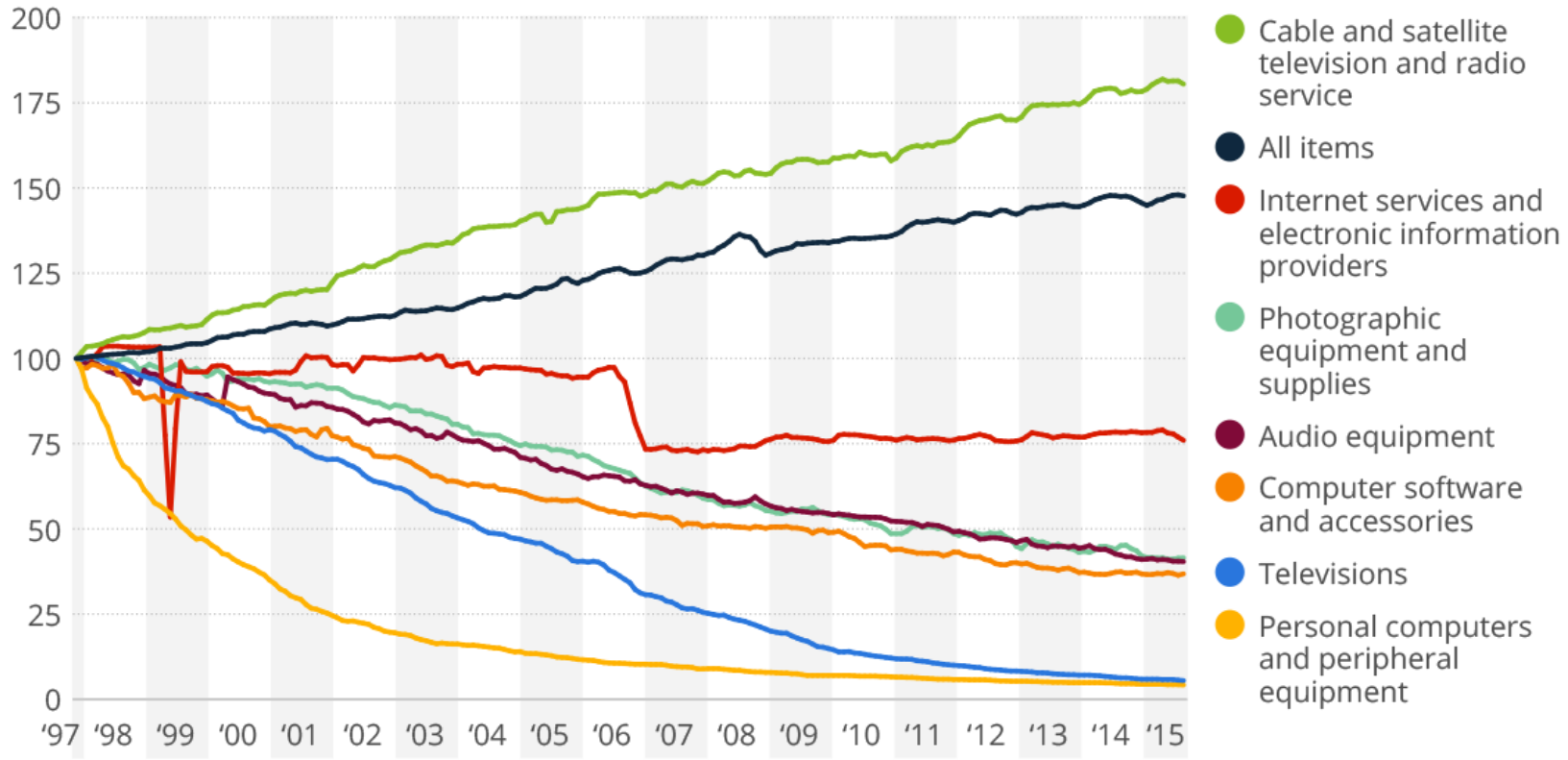
2010s and the Future: The Smartphone Evolves

https://www.technology.org/2017/09/18/cell-phone-cost-comparison-timeline/

Tech Chart of the Day

Long-Term Price Trends for Electronic Goods and Services

Consumer price indexes for televisions, computers, software and related items in the U.S.*



* 100 = price level in December 1997

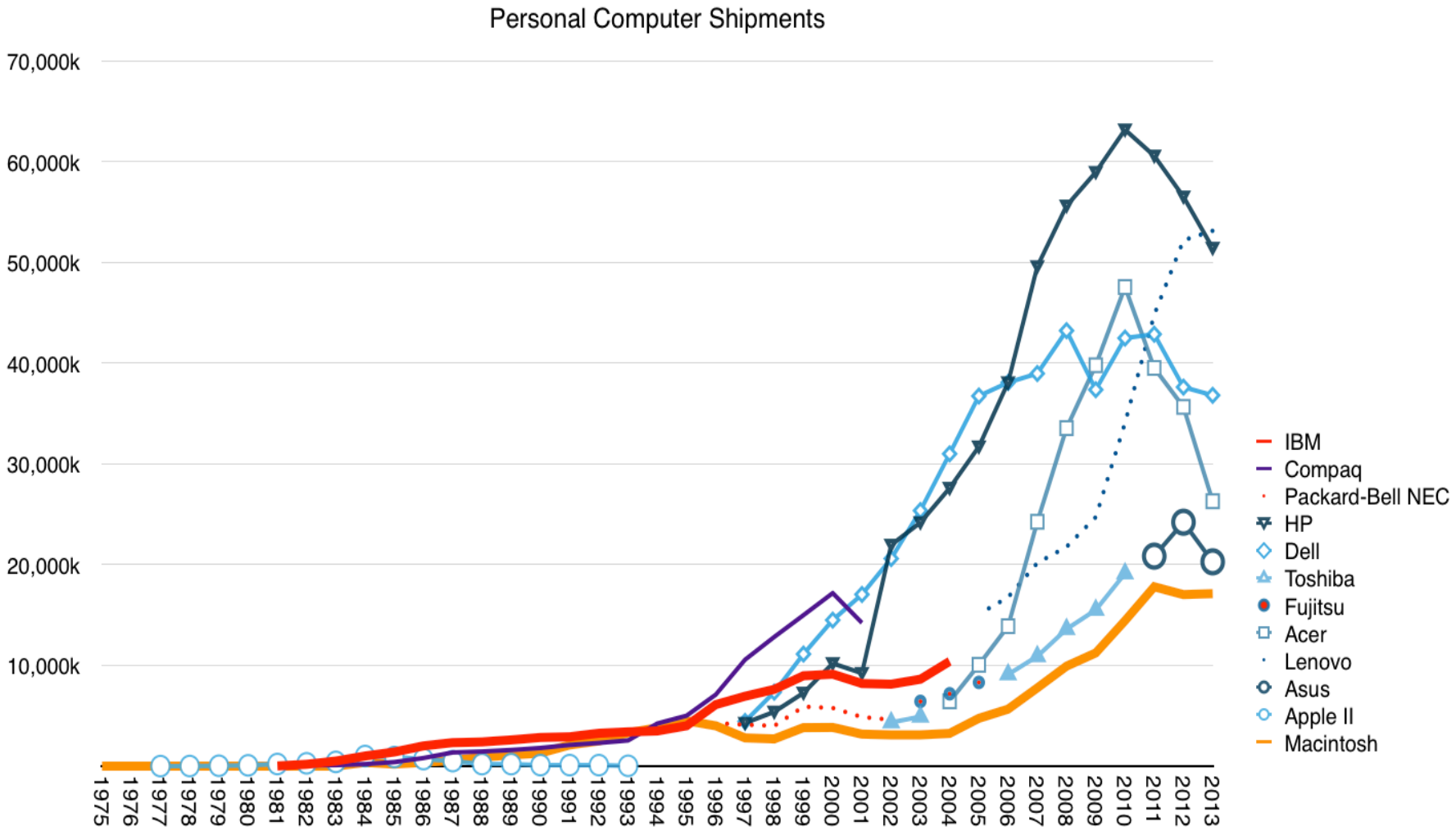
BUSINESS INSIDER

Source: U.S. Bureau of Labor Statistics

statista

https://assets.weforum.org/wp-content/uploads/2015/10/151016-Tech-cheaper-electronic-goods-BI.png

Personal Computer Shipments



http://www.asymco.com/2014/07/15/catharsis/

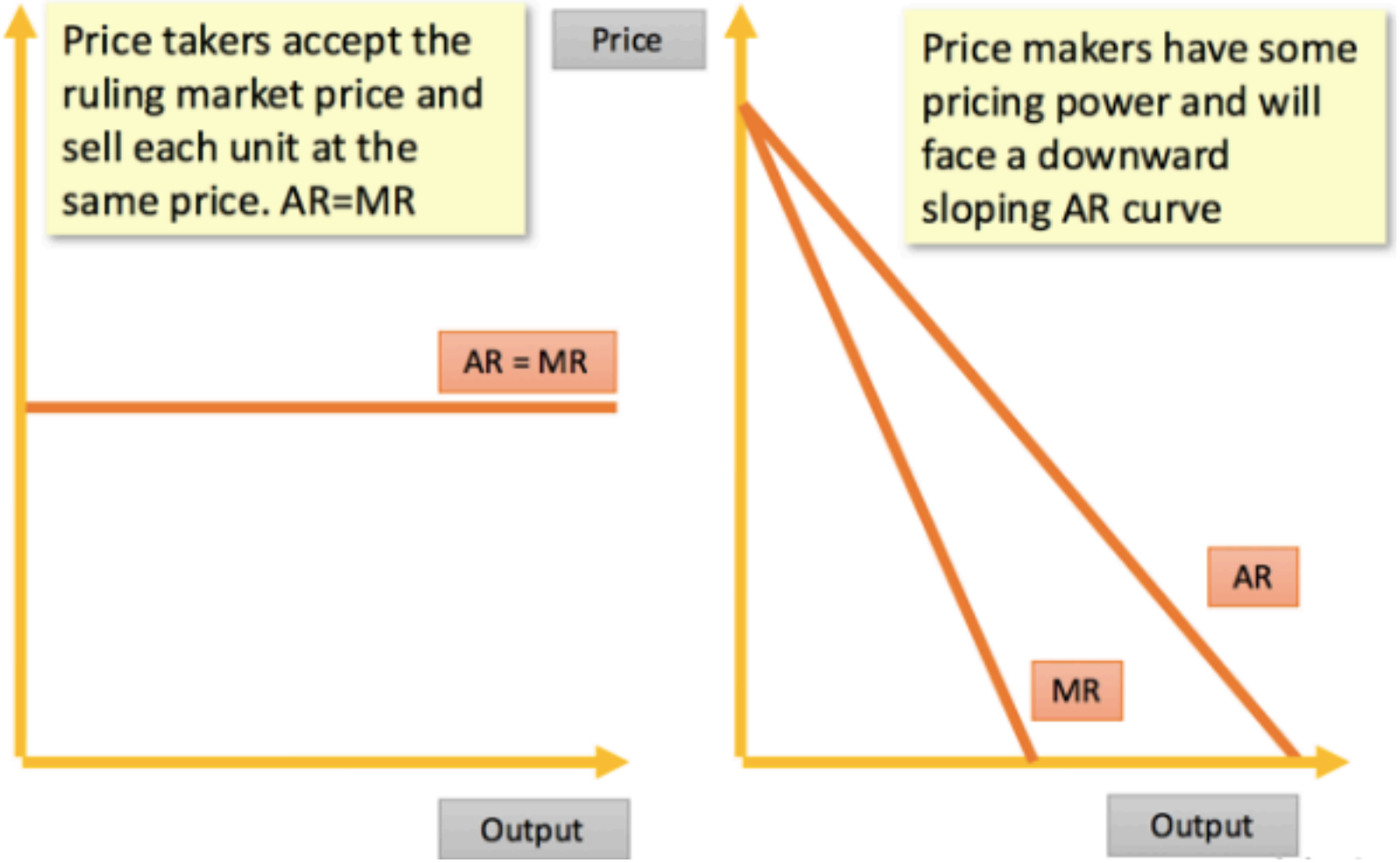
Market Competition & Firm's Decision

- In the business world, companies survive and thrive market competition because their economic activities (planning, development, management, production, distribution, marketing, sales, public relations) are valuable.
- In theory, economists model firms as a profit-maximizing agent. The principle for the business decision is MR=MC such that the net income (total income minus total expenses) is maximized.
- In this lecture, we apply this principle to a variety of simplified business environment in which firms compete and evolve.
- How will different market settings influence firms' competition decision and strategy? How will they result in different market outcomes, for the consumers, the firm per se, the competitors, and the society?

Market Revenue and Demand

- Recall that the total sales revenue equals unit price of the product times the quantity sold. TR=P*Q.
- In the market, the demand curve facing the firm provides a combination of price and quantity demanded.
- The demand curve is the firm's average revenue curve. Why?
- **AR=TR/Q=P*Q/Q=P**. The average revenue per output is equal to the price of the output. How about the MR?
- Given a demand curve, a firm can calculate its total revenue.
- Furthermore, given a demand curve, the firm can set a price at the unit elasticity to maximize its profit or total revenue.

Firm's Revenue and Demand Curve



https://www.tutor2u.net/economics/reference/price-takers-and-price-makers

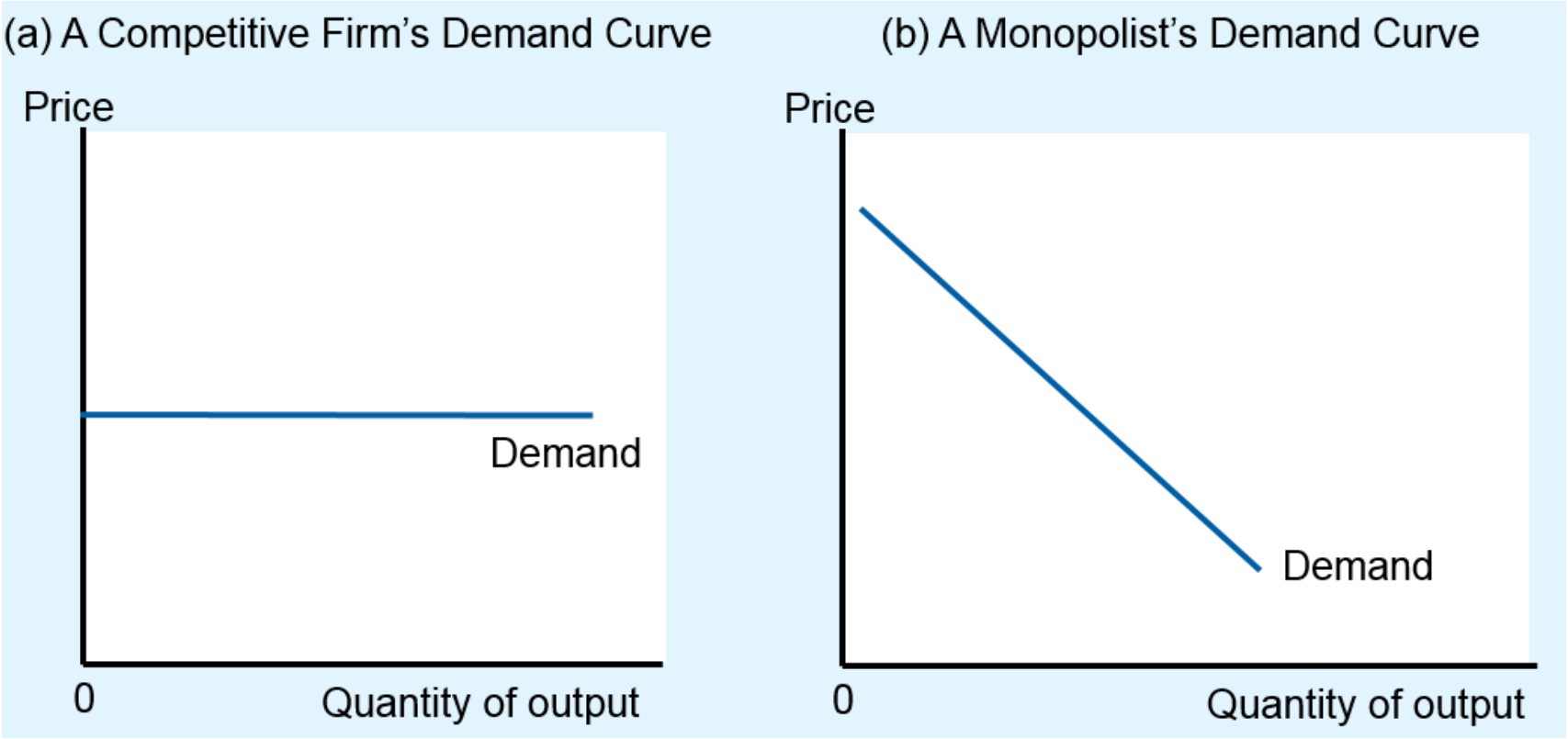
Market Demand and Power

- In the market, firms in different industries face various degrees of competition, economists apply demand curve to reflect this fact.
- For example, the market for soda drinks. You can buy it at any store at the same price. However, PC and other electronic products are highly differentiated with market leaders and brands charging higher prices, e.g., Apple Inc.
- **How would the firm's demand curve look like if the market is very competitive (intense competition)?**
- **How would it look like if the firm can set the price?**
- Possible shapes: horizontal (perfectly elastic), relatively flat (elastic), relatively steep (inelastic), vertical (perfectly in elastic).

Price Takers' Demand Curve

- Perfect competition is the term economists coined for depicting an extreme case of market competition where no buyer or seller can dominate and influence the price.
- Price-taking firms face a horizontal demand curve. If price is given, firms either take it or leave it. The only thing they can decide is the quantity supplied. Examples of pricing-taking business are hard to find. Pepsi and Coca; pizza or hotdog.
- A perfectly competitive market consists of all sorts of firms facing the same price. In addition, free entry and exit will attract or drive marginal firms in and out of business.
- Therefore, in the long run perfect competition implies zero economic profit. On average, winners and losers cancel out.

Price Taker vs Setter: Demand



- For a price-taking firm, it cannot change market price. P=AR=MR. A horizontal demand curve is implied. A price-taker, however, can decide how many units of output to produce.
- For a price-setting firm, it searches for a "good" price in order to maximize its profit. A downward sloping demand curve is implied. A price-setter decides P and Q simultaneously.

N. Mankiw, Principles of Microeconomics, 8th edition. Cengage.

Price Setter's Demand Curve

- More common in business, firms can have control over price setting to various degrees. In these cases, they are said to possess the monopolistic power in the market.
- In monopolistic market competition, firms not only decide their production quantity but also set the price to maximize profit.
- For instance, Apple's products have been usually more expensive than its competitors' (higher markup and premium). Other examples include public transportation and public utilities.
- In a monopolistic market where one company dominates with significant market power, it can be considered as a **monopoly**.
- For a monopoly, it faces least amount of competition in the market. In other words, its demand curve is relatively inelastic.

Firm's Costs and Supply Curve

- Previously, we modeled the production functions and cost functions of the firm. These are the supply side of the market as firms are the entity providing goods and services.
- Supply structure refers to firms' production and cost characteristics, and their determinants.
- All these characteristics derives from the law of production.
- The law of diminishing marginal product dictates the production as well as cost constraint facing the firm.
- More crucially, setting marginal cost equal to marginal revenue is the decision rule for profit maximization.
- Thus, the marginal cost is the supply curve of the firm.

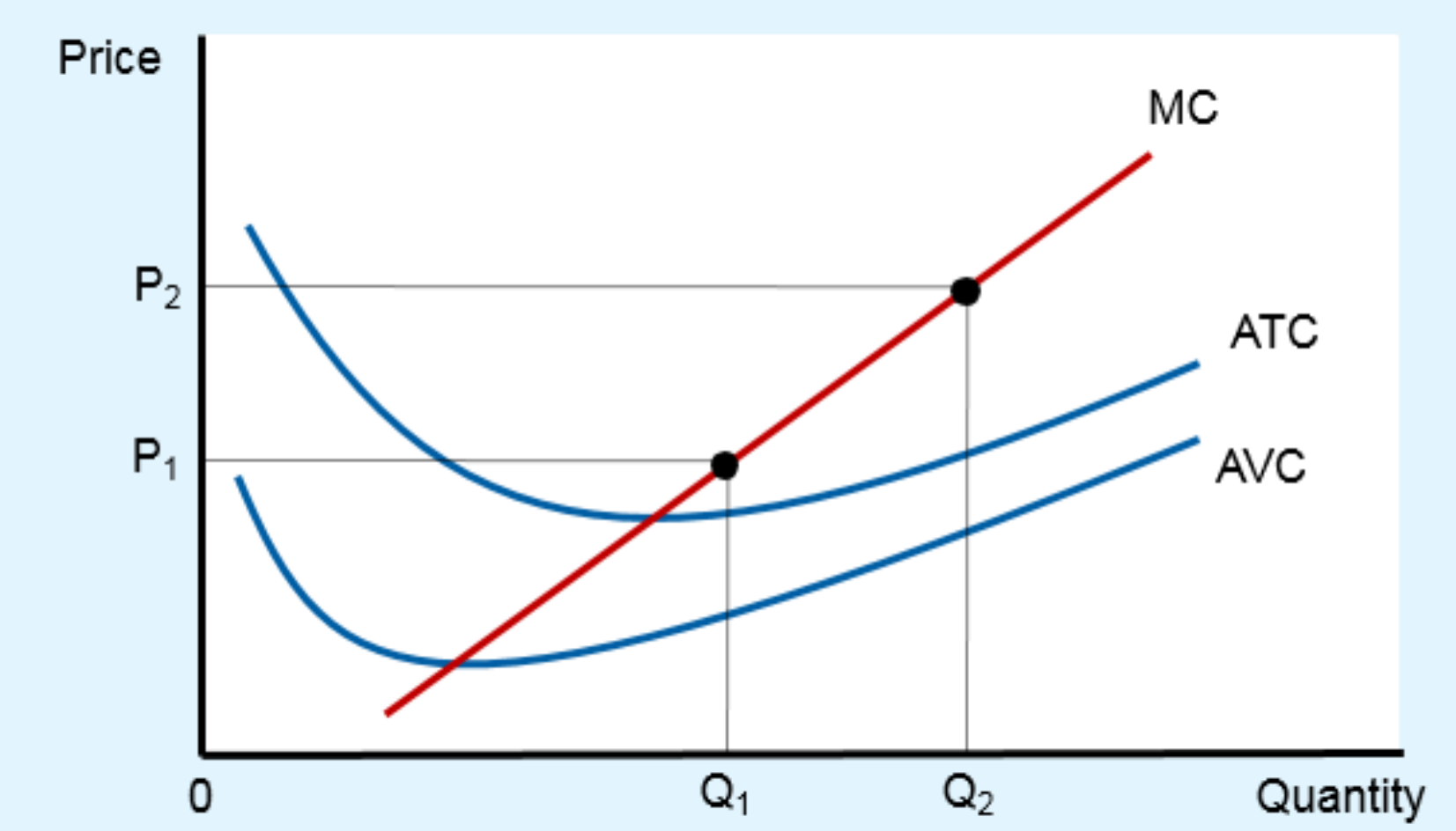
Summary of Textbook Costs

The Many Types of Cost: A Summary

Term	Definition	Description
Explicit costs	Costs that require an outlay of money by the firm	
Implicit costs	Costs that do not require an outlay of money by the firm	
Fixed costs	Costs that do not vary with the quantity of output produced	FC
Variable costs	Costs that vary with the quantity of output produced	VC
Total cost	The market value of all the inputs that a firm uses in production	$TC = FC + VC$
Average fixed cost	Fixed cost divided by the quantity of output	$AFC = FC/Q$
Average variable cost	Variable cost divided by the quantity of output	$AVC = VC/Q$
Average total cost	Total cost divided by the quantity of output	$ATC = TC/Q$
Marginal cost	The increase in total cost that arises from an extra unit of production	$MC = \Delta TC/\Delta Q$

N. Mankiw, CH13, Principles of Microeconomics, 8th edition. Cengage.

Firm's Costs and Supply Curve



By MR=P=MC principle, the firm is earning positive economic profit for (P_1, Q_1) and (P_2, Q_2).

N. Mankiw, Principles of Microeconomics, 8th edition. Cengage.

Demand, Supply, Firm's Decision*

- Two types of revenue/demand structure:

  1) Horizontal demand curve: price takers.

  2) Downward sloping demand curve: price setters.

- Three types of cost/supply structure:

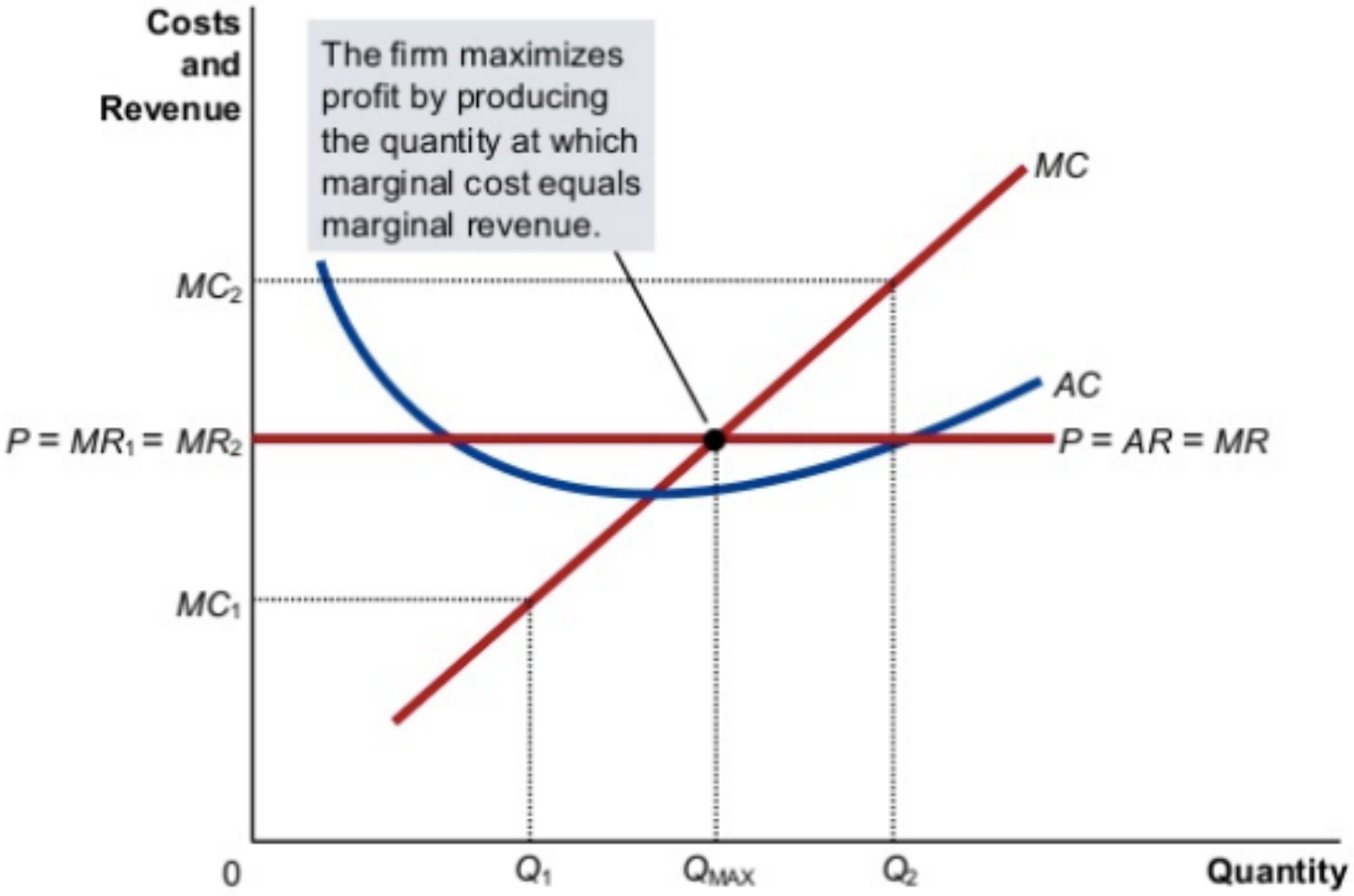
  1) Constant MC; 2) Decreasing MC; 3) Increasing MC.

Firms' Decisions: 1) given the market price, optimal output units to produce; 2) search for an optimal combination of P and Q to maximize profit; 3) operate or shut down temporarily in the short run; 4) stay or exit the market permanently in the long run.

Firm's Optimization Conditions

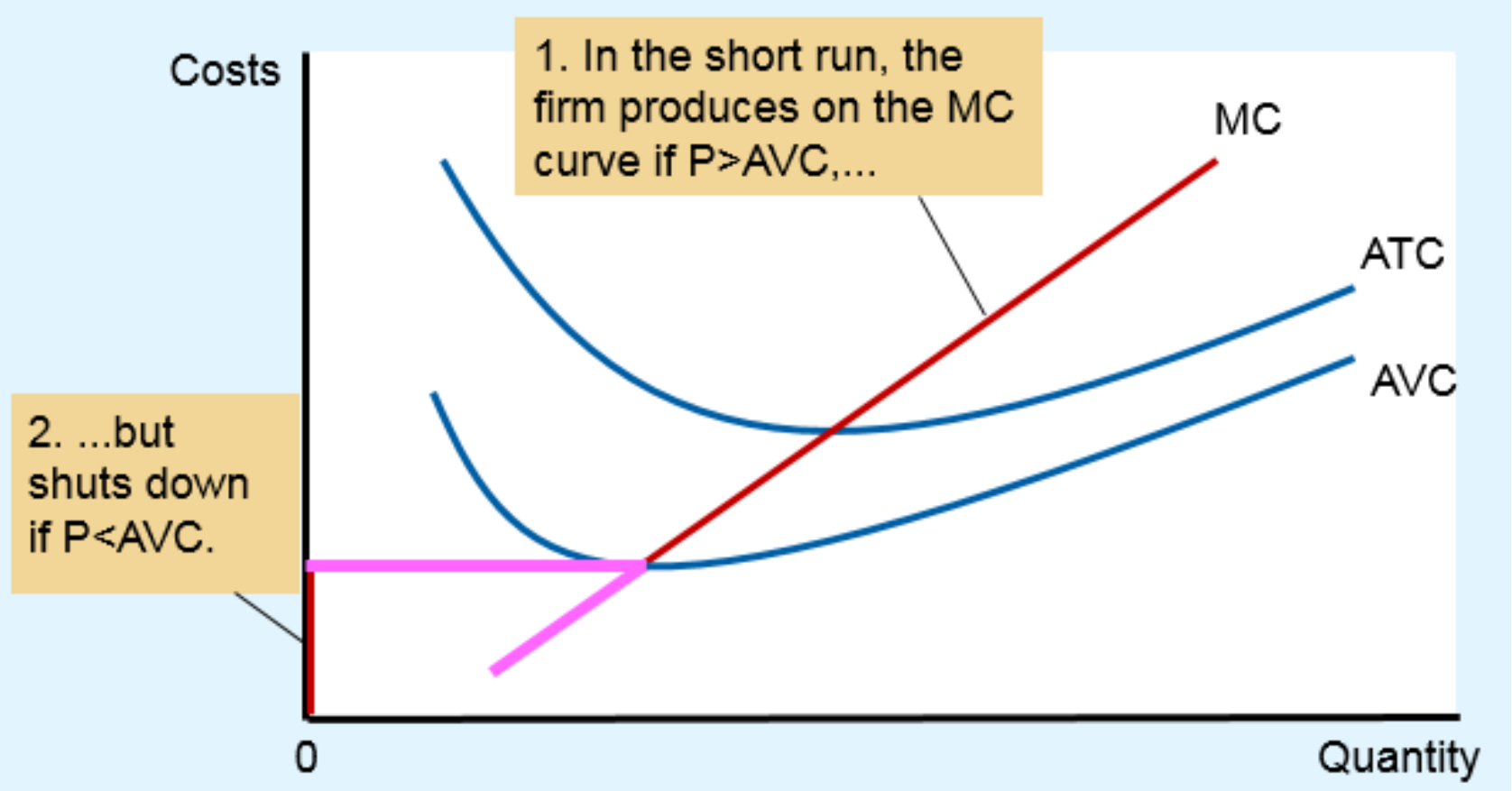
- Firm's goal is to maximize {TR(Q)-TC(Q)}.
- Short-run goal: max accounting profit
- Long-run goal: max economic profit
- Necessary condition: MR=MC
- Case 1: Constant MC & Price Taker
- Case 2: Constant MC & Price Setter
- Case 3: Decreasing MC & Price Taker
- Case 4: Decreasing MC & Price Setter
- Case 5: Increasing MC & Price Taker
- Case 6: Increasing MC & Price Setter

Price Taker's Decision: MR=MC



N. Mankiw, CH14, Principles of Microeconomics, 8th edition. Cengage.

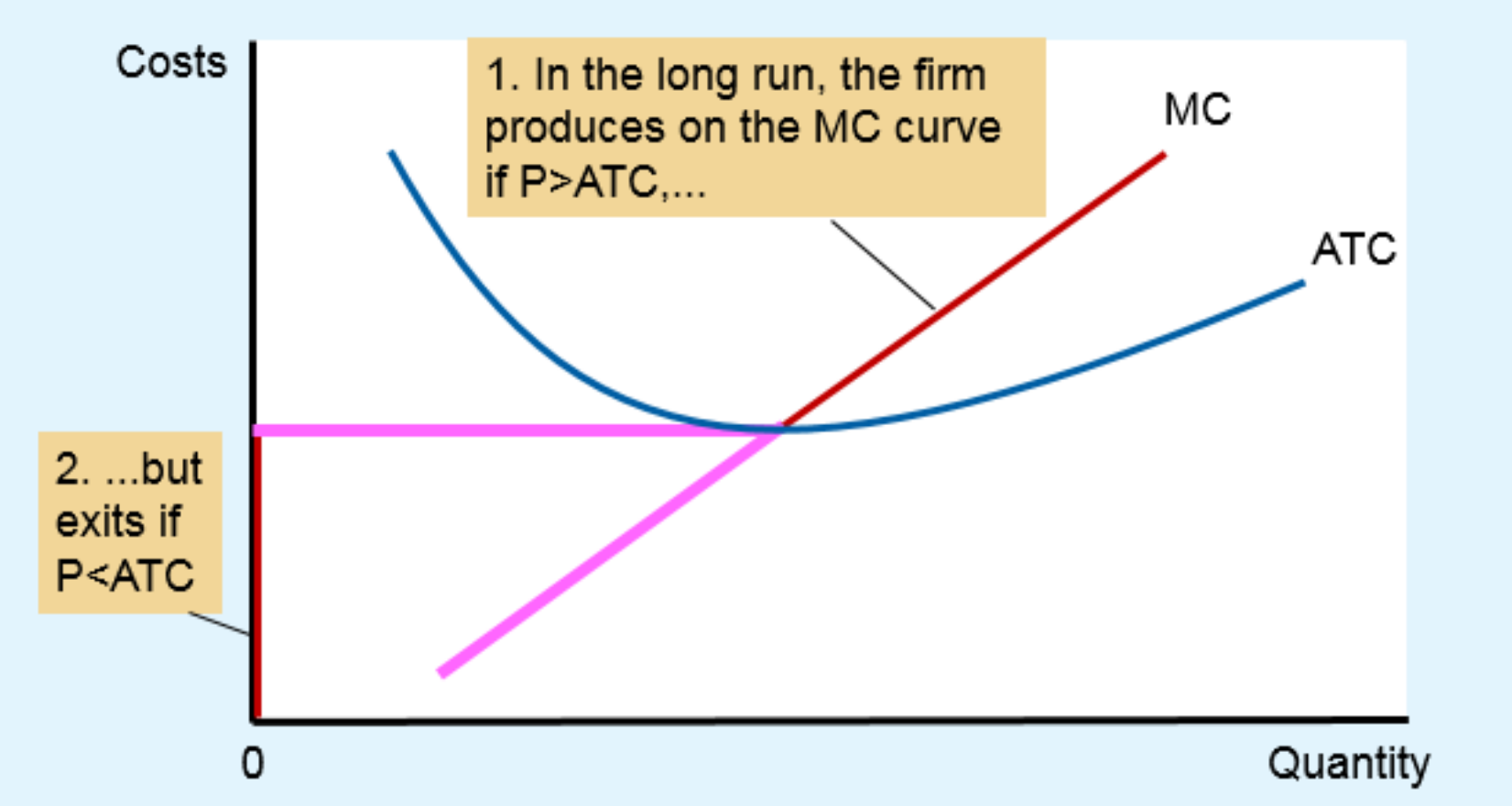
Firm's Decision in the Short Run



When price is lower than the average accounting explicit cost (P<AEC), the firm shall shut down temporarily. If price will rise in the future, the firm can cover some of the implicit costs. Closing the business temporarily, the firm can save all variable costs but not fixed costs.

N. Mankiw, CH14, Principles of Microeconomics, 8th edition. Cengage.

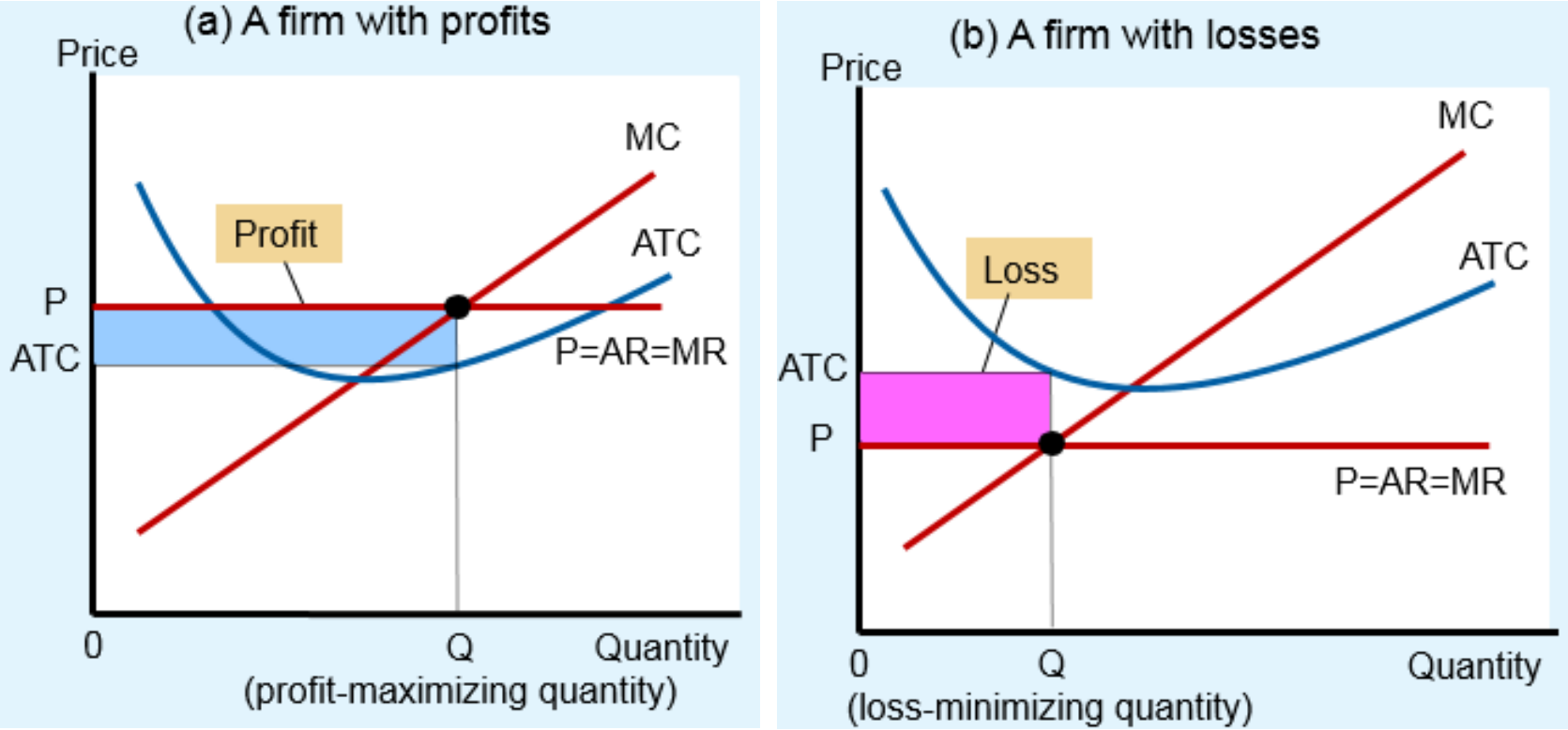
Firm's Decision in the Long Run



When price is lower than the average total cost (P<ATC=AEC+AIC), the firm will exit the market, because the owner can liquidate business and expect higher return elsewhere. In the long run, the "fixed" capital can be liquidated and invested elsewhere.

N. Mankiw, Principles of Microeconomics, 8th edition. Cengage.

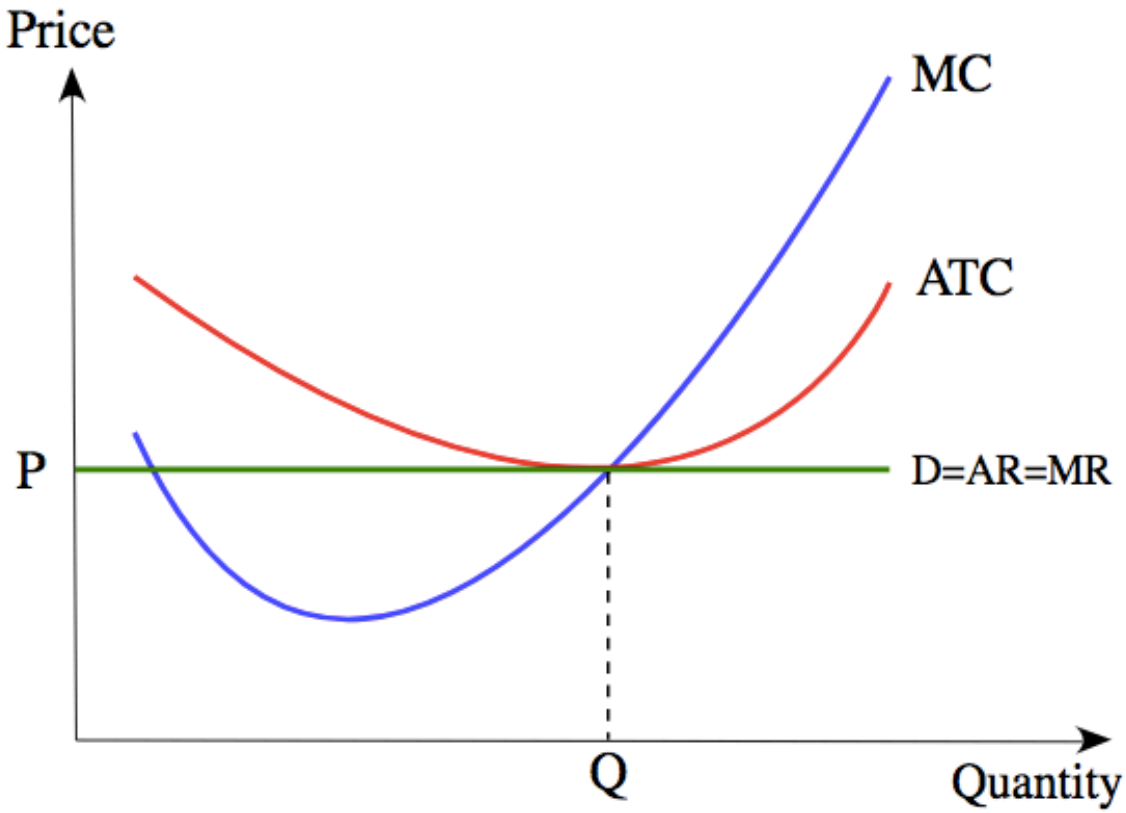
Price Taker's Decision: MR=MC=P



For price-taking firms, positive economic profit will attract competitors to enter the market; negative economic profit will drive marginal firms out of business. In the long run and in equilibrium, there will be no economic profit. This is the zero economic profit theorem.

N. Mankiw, CH14, Principles of Microeconomics, 8th edition. Cengage.

Perfect Competition and Zero Profit

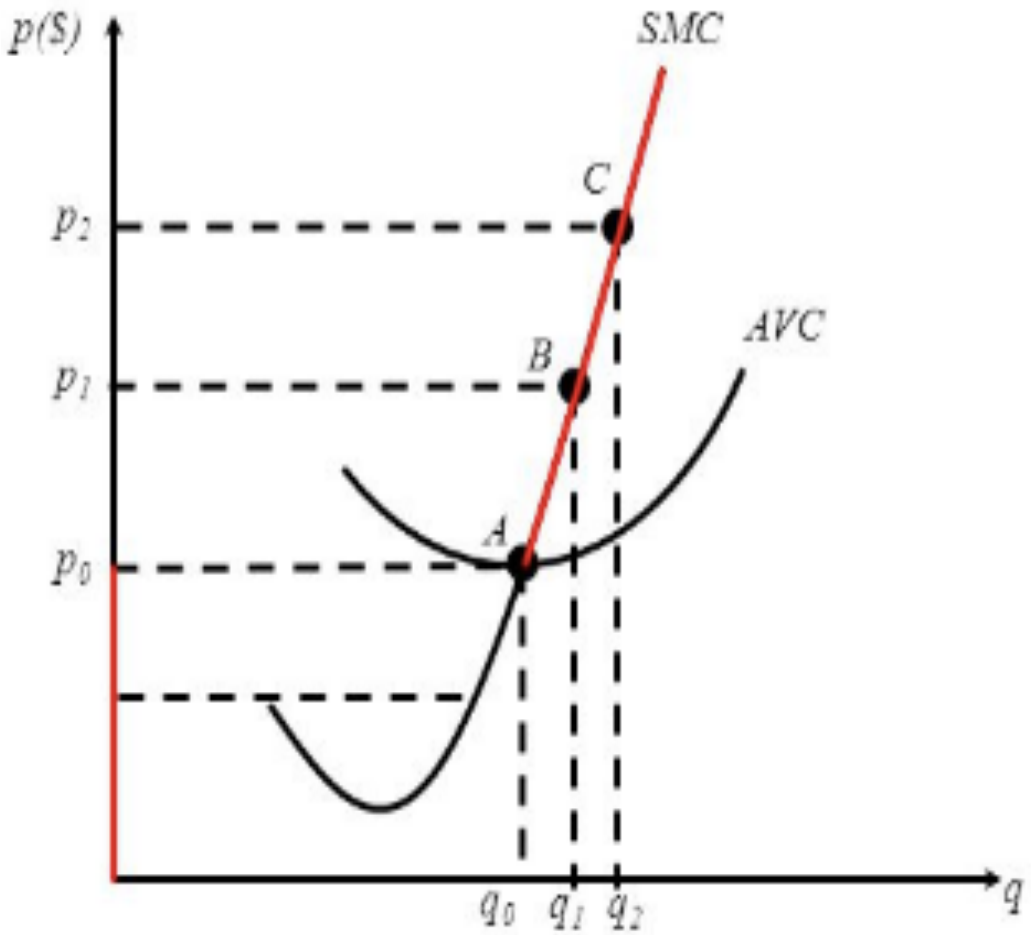


In the long-run, economic profit cannot be sustained. The entry of new firms in a perfectly competitive market causes the demand curve of each individual firm to shift down, lowering the P and TR. In the long-run, a typical firm will make zero economic profit when the market price touches the average total cost curve at its lowest point.

Perfect Competition: all firms are price-takers in the market for identical products and services with no entry barrier.

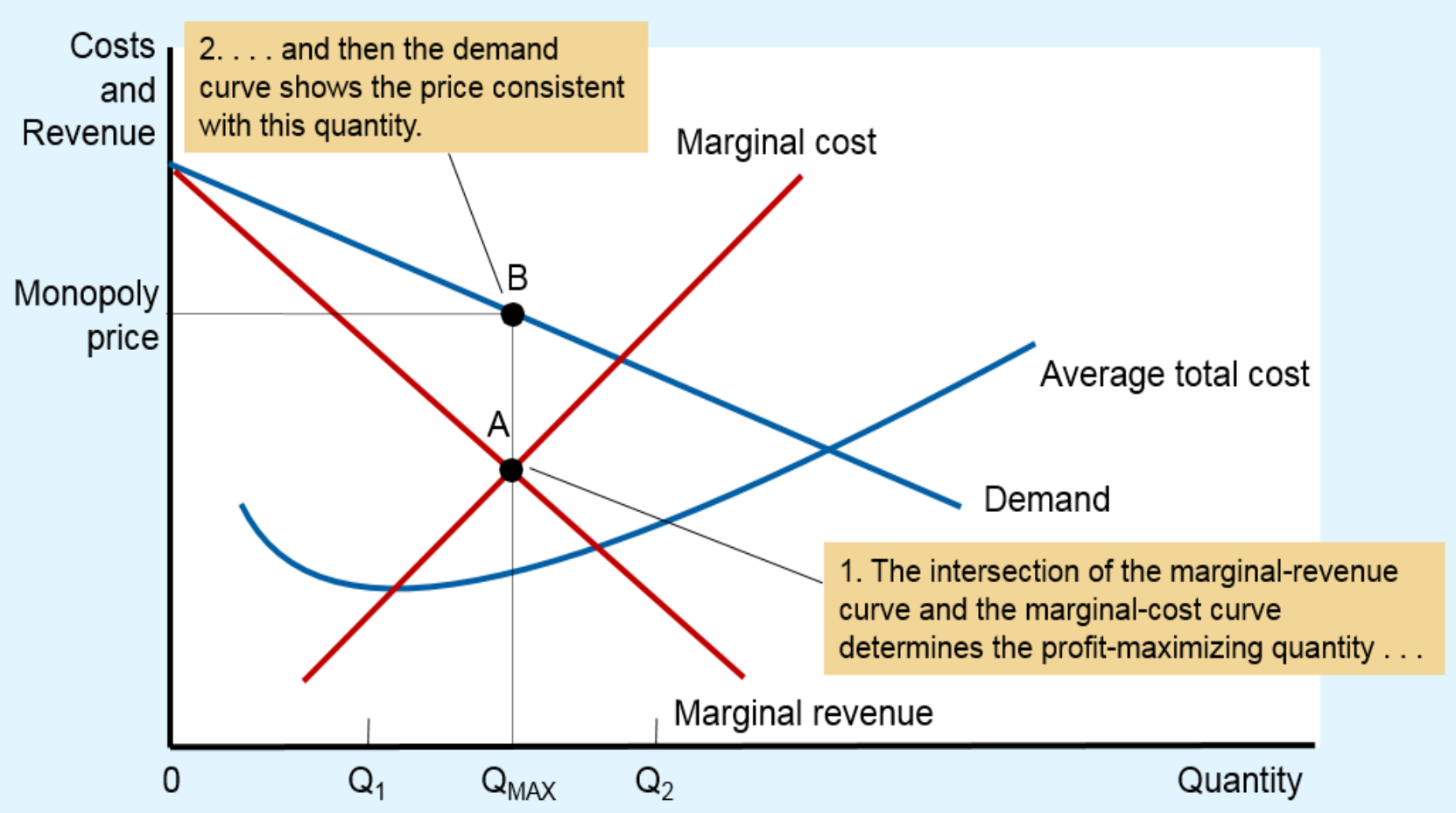
https://courses.lumenlearning.com/boundless-economics/chapter/perfect-competition/

Firm's Supply Curve: Marginal Cost



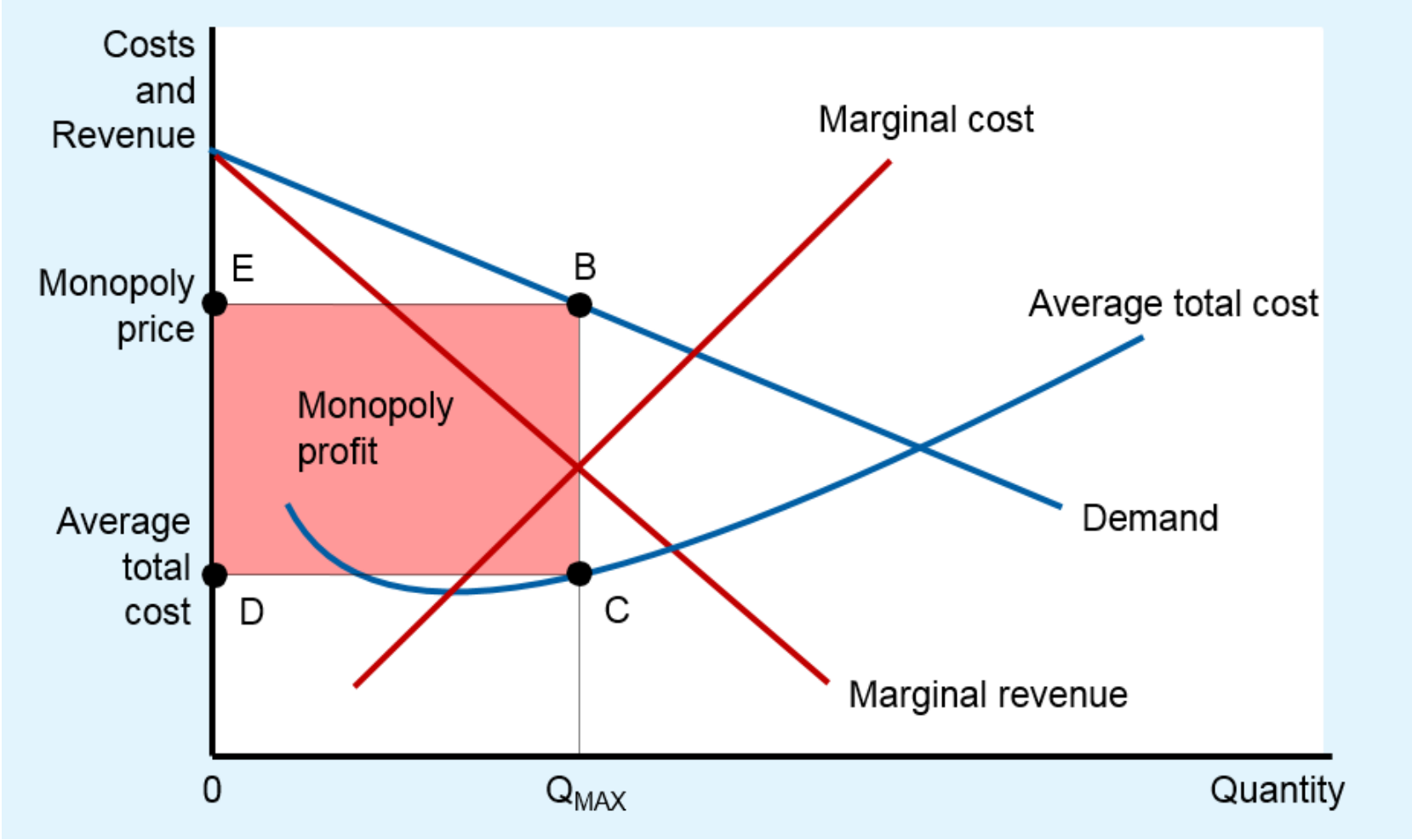
- Firms' decision is based on the MR=MC principle.
- MR is determined by the firm's demand curve and whether it can set prices.
- MC is determined by its production technology when employing labor and capital.
- The decision is also made when MC is rising or MP falling when maximizing TP.

Price Setter's Decision: MR=MC



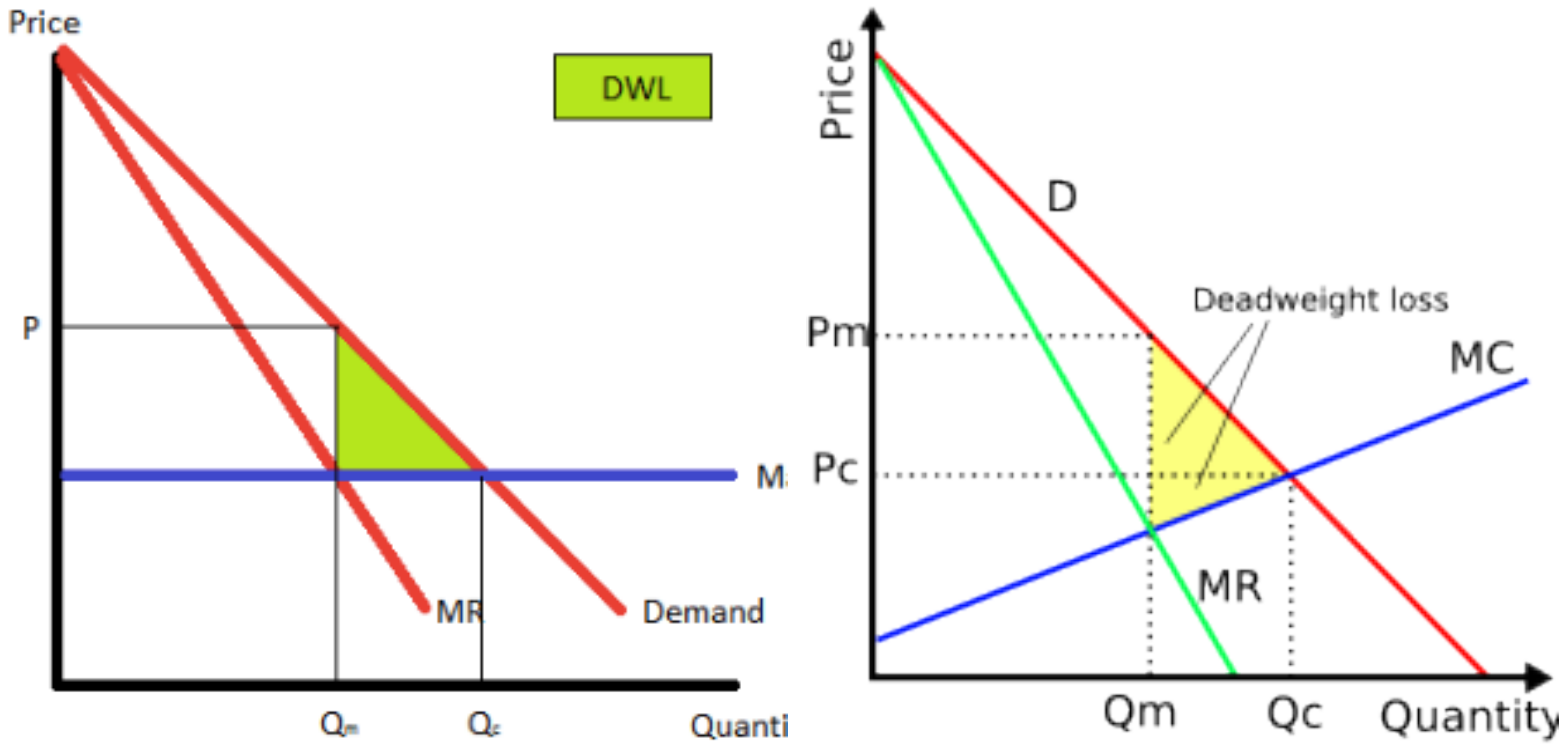
N. Mankiw, CH14, Principles of Microeconomics, 8th edition. Cengage.

Price Setter's Maximum Profit



N. Mankiw, CH14, Principles of Microeconomics, 8th edition. Cengage.

Price Setter: Constant vs Rising MC



By MR=MC, the optimal decision for a price setter is (Q_m, P_m). The same decision rule applies to rising MC. As a result of the monopoly pricing, total market welfare is reduced by a **deadweight loss (DWL)** because $P_m > P_c$ & $Q_m < Q_c$ compared to perfect competition.

https://econ101help.com/dead-weight-loss-monopoly/
http://micro.econproph.net/part-iii/unit-9-monopoly-2/monopoly-deadweightloss-2/

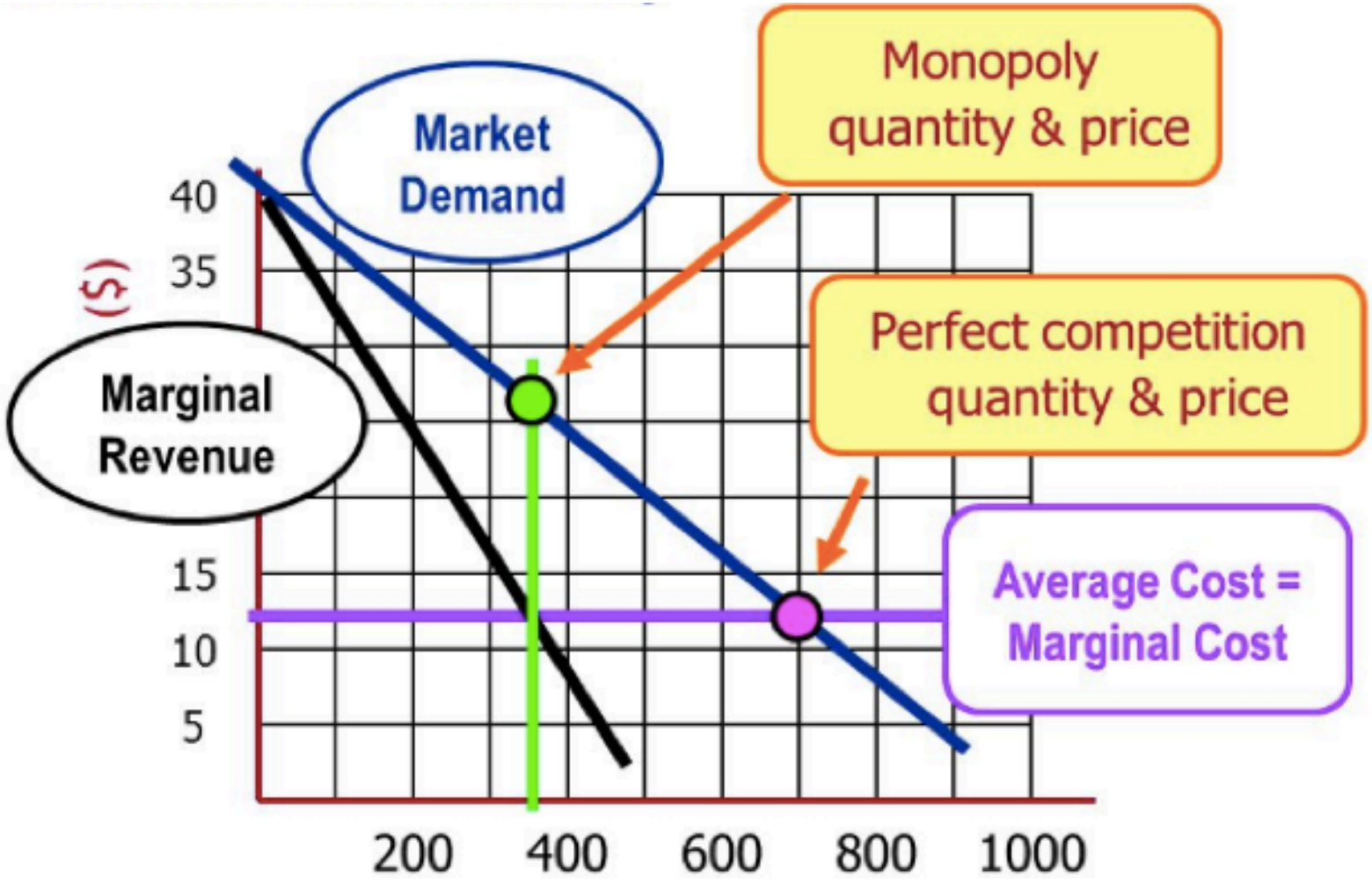
Perfect Competition vs Monopoly

- Price taker: take market price as given and decide output.
- Price setter: set the price and output to maximize rent.
- Price taking firms cannot influence market price.
- Price setting firms have market power and earn "profits."
- Which model is more realistic and applicable?

- What is the source of market power and extra profits?
- Can firms survive perfectly competitive market? How?
- Can monopoly firms earn extra profit in the long run?

Now apply the model to explain the evolution of cellphone and PC industries: P, Q, and the number of surviving firms.

Perfect Competition vs Monopoly



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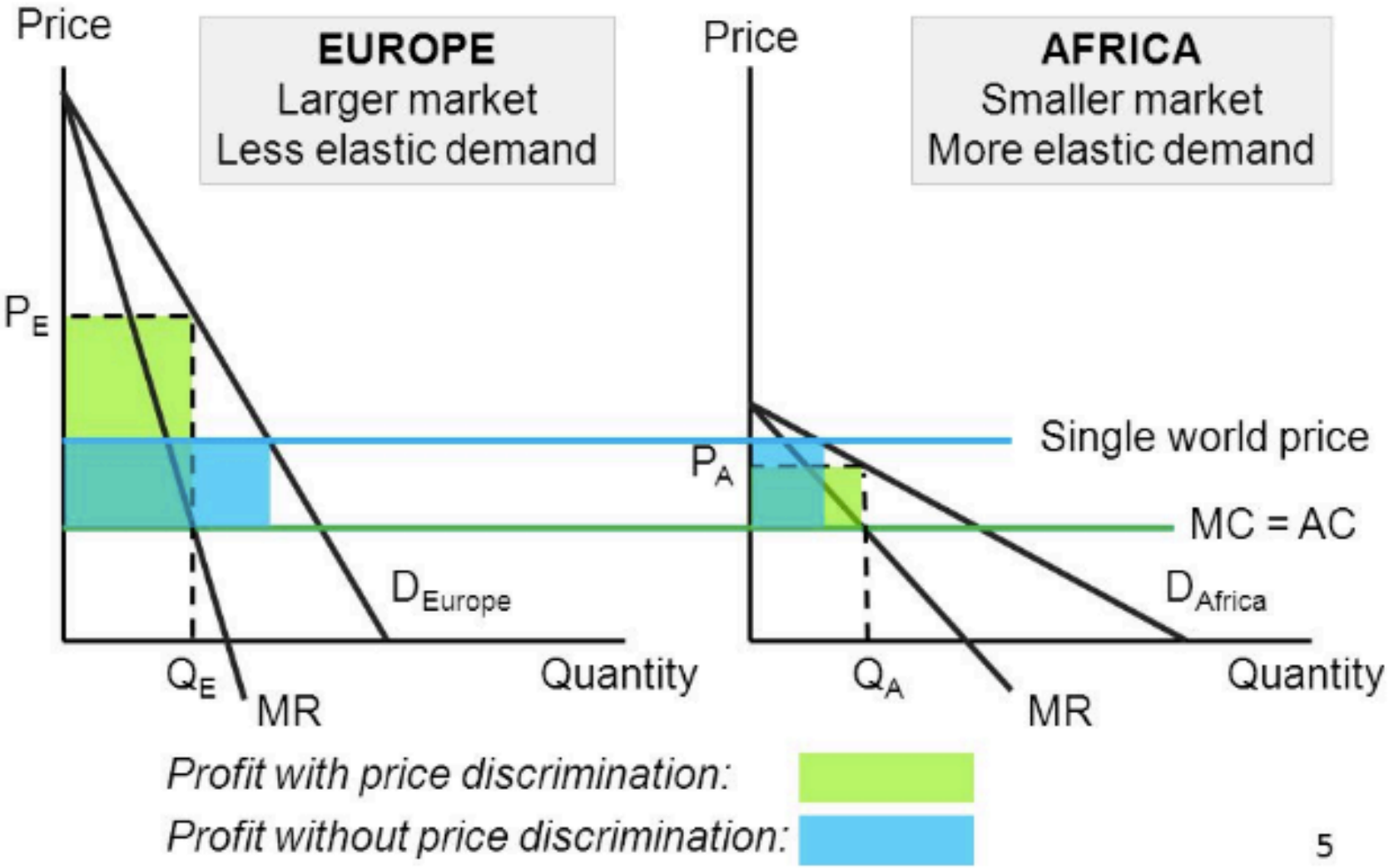
Monopoly Firm's Pricing Strategy

- Obviously, a monopoly will not set a single price even though it can maximize its profit because more potential profits can be extracted from those "left-behind" and "high-status" consumers.
- Therefore, the monopoly can adopt various price strategies.
- Price discrimination: charge different consumers different prices at the same time for the same product or service. Successful price discrimination must prevent consumers from price arbitrage.
- Block pricing: lower the price when the consumer buys more of it.
- Membership pricing: charge a membership fee and offer discounts.
- All-or-nothing pricing: lower the price of a product if the consumer buys an amount required by the firm.
- Bundling: sells two or more products together at a single price.

Monopoly Price Discrimination: Example



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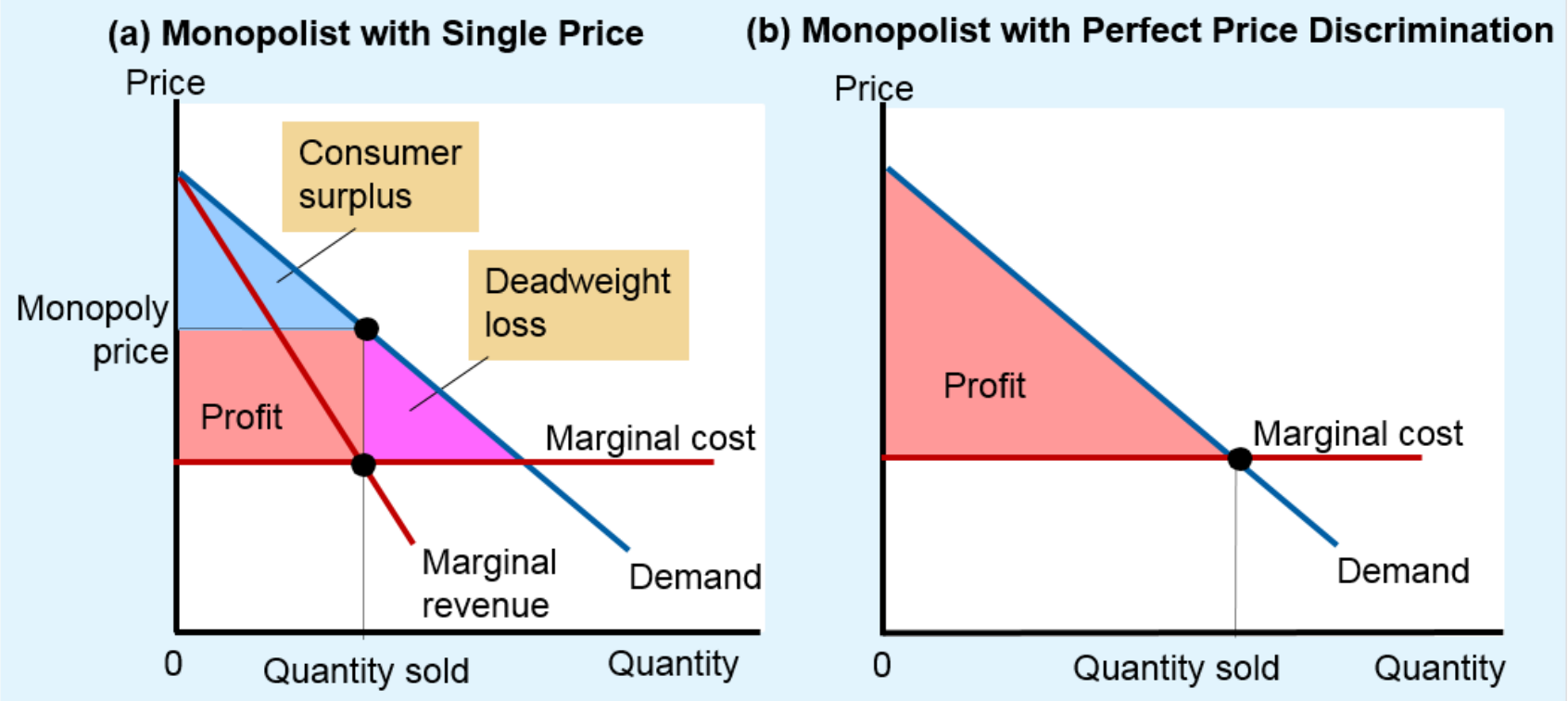
Monopoly Price Discrimination

- **Price discrimination** (PD) happens when a firm charges a different price to different groups of consumers for an identical good or service, for reasons not associated with costs of supply. It serves to extract more consumer surplus and remove DWL inefficiency. Typical methods include coupons, age/ occupational/early-bird discounts, retail incentives and gender based pricing. However, peak and off-peak pricing is not PD.
- In pure or perfect price discrimination, the seller will charge each customer the maximum price they are willing and able to pay. In more common forms of price discrimination, the seller places customers in groups based on certain attributes and charges each group a different price.
- Note that charging different prices for the same good with similar features is not pure price discrimination because product differentiation gives a firm control over price and the potential to charge consumers a premium arising from differences in the quality or performance of the product.

https://www.tutor2u.net/economics/reference/monopoly-price-discrimination
https://blog.blackcurve.com/why-do-companies-price-discriminate

Monopoly Deadweight Loss Inefficiency



Panel (a) shows a monopoly that charges the same price to all customers. Total market welfare equals the sum of producer surplus and consumer surplus. DWL is inefficient.

Panel (b) shows a monopoly that can perfectly price discriminate. Consumer surplus equals zero and all surplus become the firm's profit. The DWL is fully removed.

Which is NOT Price Discrimination?

Market haggling

Mobile phone contracts / tariffs

Taxi fares at peak times of the day

KET TYPE	OFF-PEAK PRICES	PEAK PRICES
Adult	£7.29	£8.49
Child	£5.29	£6.49
Teen	£5.79	£6.79
Student	£5.99	£7.29
Senior	£5.29	£6.49
Family of 4	£21.16	£25.96

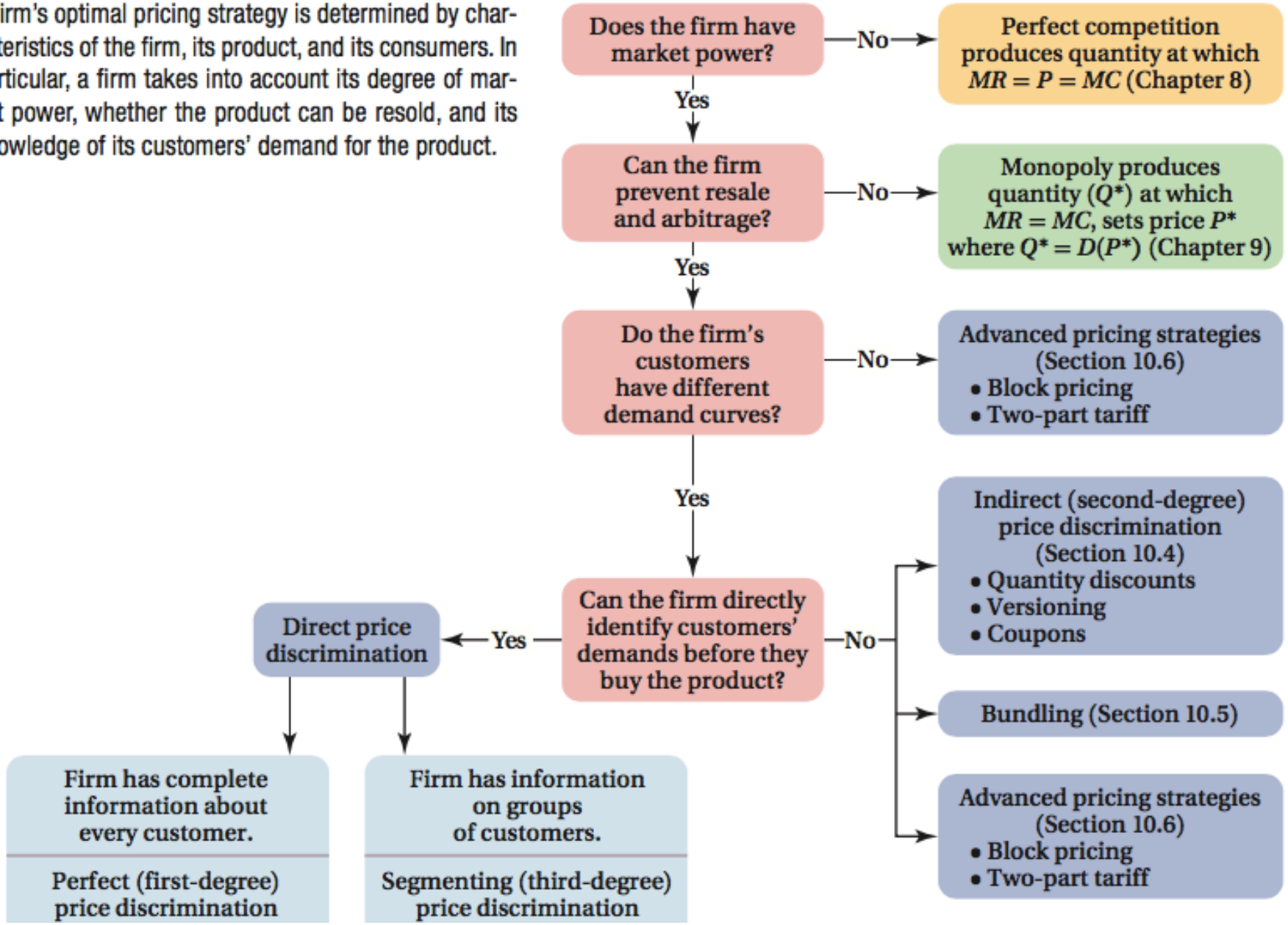
Cinema ticket prices

Hairdresser discounts

Educational bursaries

https://www.tutor2u.net/economics/reference/topical-examples-of-price-discrimination
https://www.economicsonline.co.uk/Business_economics/Price_discrimination.html

A firm's optimal pricing strategy is determined by characteristics of the firm, its product, and its consumers. In particular, a firm takes into account its degree of market power, whether the product can be resold, and its knowledge of its customers' demand for the product.



Market Structure Classification

Market Structure is the competitive environment in which firms operate. Entry barrier is the key reason for a firm's market power.

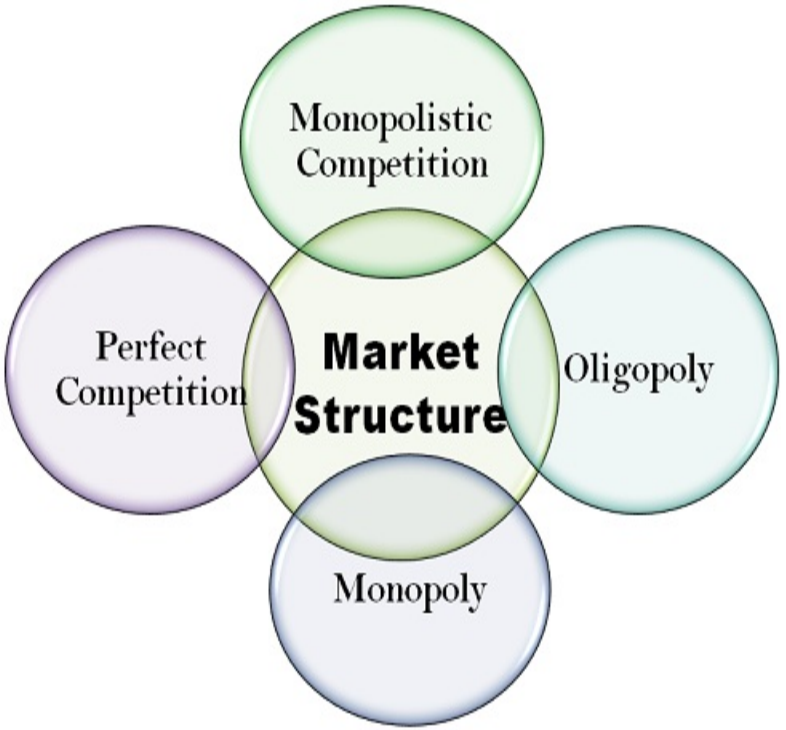
- Perfect Competition depicts a market or industry with price-taking firms producing identical products and no entry barriers.
- Monopoly is a market featured by a single firm, called monopolist. Duopoly is a market served by two firms. Oligopoly is a market structure featured by competition among a small number of firms.
- Imperfect Competition is characterized by market structures between perfect competition and monopoly.
- Monopolistic Competition is a type of imperfect competition with a large number of firms in which each firm has some market power but makes zero economic profit in the long run.

Market Structure Identification

Can you provide examples?

Can you rank four types of market structure in terms of the following features?

- Market power
- Market shares
- Entry barrier
- Number of firms
- Product differentiation



Competition Features	Market Structure		
	Perfect Competition	**Monopolistic Competition**	**Monopoly**
Features all firms share			
Goal of firms	Maximize profits	Maximize profits	Maximize profits
Rule for maximizing profit	MR= MC	MR= MC	MR= MC
Can earn economic profits in the short run?	Yes	Yes	Yes
Features monopolistic competition shares with monopoly			
Price taker?	Yes	No	No
Price	P = MC	P > MC	P> MC
Produces welfare-maximizing level of output?	Yes	No	No
Features monopolistic competition shares with perfect competition			
Number of firms	Many	Many	One
Entry in the long run?	Yes	Yes	No
Can earn economic profits in the long run?	No	No	Yes

N. Mankiw, CH16, Principles of Microeconomics, 8th edition. Cengage.

The Nature of the Firm

Outside the firm, price movements direct production, which is coordinated through a series of exchange transactions on the market. Within a firm, these market transactions are eliminated, and in place of the complicated market structure with exchange transactions is substituted the entrepreneur–coordinator, who directs production. It is clear that these are alternative methods of coordinating production. Yet, having regard to the fact that if production is regulated by price movements, production could be carried on without any organization at all, well might we ask, Why is there any organization?…

Ronald Coase (1937), The Nature of the Firm

https://adambrown.info/p/notes/coase_the_nature_of_the_firm

Transaction Costs and Firm's Size

Other things being equal, therefore, a firm will tend to be larger:

(a) the less the costs of organizing and the slower these costs rise with an increase in the transactions organized;

(b) the less likely the entrepreneur is to make mistakes and the smaller the increase in mistakes with an increase in the transactions organized;

(c) the greater the lowering (or the less the rise) in the supply price of factors of production to firms of larger size.

Ronald Coase (1937), The Nature of the Firm

https://www.dallasfed.org/~/media/documents/research/ei/ei0303.pdf

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[5] Competition https://www.econlib.org/library/Enc/Competition.html

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https://mru.org/courses/principles-economics-microeconomics/monopoly-profit-maximization-price-aids-medication

[10] MRU - The Rise of Superstar Firms and the Fall of the Labor Share 6:47
https://mru.org/courses/economists-wild/rise-superstar-firms-and-fall-labor-share

Videos

201811 Is Google a monopoly? | CNBC Explains 3:41
https://www.youtube.com/watch?v=7rH_W5PN8ns

201904 Is Amazon Too Big? 14:01 | PolyMatter
https://www.youtube.com/watch?v=EYPs-ya_GDA

201901 Why Airbus And Boeing Dominate The Sky 14:46
https://www.youtube.com/watch?v=2zaUOUiNjJY

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