

Week 2: practice problems

ECON 1-01

TA Allegra Saggese
Date January 12, 2026

Professor: KC Fung
Topic: economic principles and maths

Problem 0

What are the three economy wide interactions? Can you give an example of one real-world event that embodies one of these ideas?

Problem 1

Define economic growth with respect to the production possibility frontier (PPF). How does the PPF allow us to understand opportunity cost?

Problem 2

What is the approximate size of California's economy? How do we measure the size of the economy? And who does CA trade with?

Problem 3

Calculate the value of x in the following percentages:

1. $x\%$ of 40 is 5
2. 25% of 1800 is x
3. 12% of x is 96

Problem 4

Take the first derivatives, with respect to x of the following equations:

1. $x^2 + 2x$
2. $\ln(x)$
3. $3x^4y^2$
4. $1.5x^2 + 16x$

Week 3: practice problems

ECON 1-01

TA Allegra Saggese
Date January 19, 2026

Professor: KC Fung
Topic: supply and demand

No Monday section today. Please note these problems cover Chapter 2-3 in the textbook and focus on supply and demand topics covered during Week 2. Problems are adapted from KC Fung's lecture slides and Krugman textbook.

Problem 0

What is the market demand curve? What does it capture and how do we calculate it when we have many individual consumers' demand?

Problem 1

In the text *Globalisation and the Reform of European Social Models* by Andre Sapir, available in the modules tab as a PDF of Canvas, the author makes three key points on the state of Europe's economy. Explain how each of these relates to the efficiency-equity tradeoff.

Problem 2

1. **Percent change:** Let $A = 40$ and $B = 50$.

(a) Compute the percent change from A to B :

$$\frac{B - A}{A}$$

(b) Compute the percent change from B to A :

$$\frac{A - B}{B}$$

(c) Compute and simplify the symmetric change from A to B :

$$\frac{B - A}{(A + B)/2}$$

2. **Working with linear functions and solving for an intersection.** Let

$$f(x) = 120 - 3x, \quad g(x) = 20 + 2x$$

(a) State the slope of $f(x)$.

(b) State the slope of $g(x)$.

- (c) Solve for the value of x such that $f(x) = g(x)$.
- (d) Find the corresponding y -value at the intersection point.

3. **Intersections and area between a line and a constant.** Let

$$y_1 = 30 - x, \quad y_2 = 6$$

- (a) Find the x -intercept of y_1 (the value of x where $y_1 = 0$).
- (b) Find the intersection point of y_1 and y_2 (solve $y_1 = y_2$).
- (c) Compute the area of the region enclosed by y_1 , y_2 , and the y -axis.

4. **Percent change:** Let $X = 25$ and $Y = 40$.

- (a) Compute the percent change from X to Y :

$$\frac{Y - X}{X}$$

- (b) Compute the percent change from Y to X :

$$\frac{X - Y}{Y}$$

- (c) Compute and simplify the symmetric change from X to Y :

$$\frac{Y - X}{(X + Y)/2}$$

- (d) State whether your answer in part (c) is positive or negative.

5. **Percent change:** Let $M = 12$ and $N = 3$.

- (a) Compute the percent change from M to N :

$$\frac{N - M}{M}$$

- (b) Compute the percent change from N to M :

$$\frac{M - N}{N}$$

- (c) Compute and simplify the symmetric change from M to N :

$$\frac{N - M}{(M + N)/2}$$

- (d) State whether your answer in part (c) is positive or negative.

Problem 3

Consider a market for a monthly subscription TV service with the following demand and supply functions:

$$Q_d(p) = 100 - 2p$$

$$Q_s(p) = 4p$$

where p is the monthly subscription price (in dollars) and Q is the number of subscriptions.

1. Find the competitive equilibrium price and quantity
2. Compute consumer surplus (CS)
3. Compute producer surplus (PS)
4. Compute total surplus (TS)

Week 4: practice problems

ECON 1-01

TA: Allegra Saggese
Date: January 24, 2026

Professor: KC Fung
Topic: MT #1 Review

The topics covered in the lead up to the first midterm include: first principles, models, supply and demand, consumer and producer surplus (equating to total surplus), the European model(s) of welfare, price controls, elasticities, taxation and introduction to trade. Please review Krugman & Wells chapter Parts 1,2,3 or chapters 1-8. Questions were adapted from Krugman & Wells, the content provided by KC Fung in lecture slides, and ChatGPT manipulation of numbers.

Problem 1: Price elasticity of demand

Suppose the price of a concert ticket increases from \$25 to \$35, and the quantity demanded decreases from 1,200 tickets to 900 tickets

- Using the midpoint method, calculate the price elasticity of demand
- Classify demand as elastic, inelastic, or unit-elastic
- Based on your elasticity result, determine whether total revenue increases, decreases, or remains unchanged, and explain briefly

Problem 2: Supply and demand

Suppose laptops are a normal good. At the same time, consumer income increases and the price of computer chips (a key input) rises

- Explain how each event affects demand or supply
- Draw a supply-and-demand diagram showing both shifts
- Predict the direction of change in the equilibrium price and the equilibrium quantity, and explain your reasoning

Problem 3: Price floors and ceilings

A government imposes a binding price ceiling in the rental housing market

- Draw a supply-and-demand diagram showing the binding price ceiling and the resulting quantity traded
- Label the areas corresponding to consumer surplus, producer surplus, and deadweight loss
- Explain why deadweight loss arises under a binding price ceiling

Problem 4: Opportunity cost

An economy produces only two goods: electric cars and solar panels. Its production possibility frontier (PPF) is bowed, or curved outward.

- (a) Explain what the bowed-out shape implies about opportunity cost as production shifts toward one good
- (b) Explain what it means if the economy is producing at a point strictly inside the PPF
- (c) Describe two changes or policies that could move the economy from inside the PPF to a point on the PPF

Problem 5: Cross-price elasticities

Suppose coffee and energy drinks are substitutes. When the price of energy drinks rises by 20%, the quantity demanded of coffee increases by 10%

- (a) Calculate the cross-price elasticity of demand
- (b) Interpret the sign and magnitude of your answer
- (c) Suppose instead that consumer income rises and coffee demand increases significantly. What does this suggest about the income elasticity of demand for coffee

Problem 6: Tariffs

Suppose the domestic price of steel is \$600 per ton, while the world price of steel is \$400 per ton. Assume the country is a small importing country. The government imposes a tariff of \$100 per ton on imported steel.

- (a) What price will domestic consumers pay after the tariff is imposed?
- (b) Explain how the tariff affects domestic producers, domestic consumers, and government revenue
- (c) Using a supply-and-demand diagram for the steel market with trade, identify the regions representing consumer loss, producer gain, government revenue, and deadweight loss

Week 6: practice problems

ECON 1-01

TA: Allegra Saggese
Date: February 9, 2026

Professor: KC Fung
Topic: Chapter 8-9

We will cover trade and decision making in this section. Questions were adapted from Krugman & Wells, the content provided by KC Fung in lecture slides, and ChatGPT manipulation of numbers.

Problem 1: Costs

A student is deciding whether to run a small tutoring business for a month. Imagine the business earns revenue of \$3,200. The explicit costs are \$700 for supplies and \$300 for advertising. If the student does not run the business, they could work a campus job and earn \$1,500 this month. The student uses \$2,000 of their own savings to buy materials and could have earned 2% interest over the month on that money in a bank account. Now:

- (a) Compute accounting profit
- (b) Compute the implicit cost
- (c) Compute economic profit
- (d) Based on your answer, do you think the student run the business?

Problem 2: Marginal costs and benefits

A firm chooses output q to maximize net benefit
Marginal benefit and marginal cost are

$$MB(q) = 50 - 0.5q$$

$$MC(q) = 10 + 0.25q$$

- (a) What does the *marginal benefit curve* show?
- (b) Find the quantity q^* where $MB(q) = MC(q)$
- (c) Check whether $MB(q)$ is greater than $MC(q)$ at $q = 40$
- (d) Explain in one sentence why the rule $MB \geq MC$ is used for “how much” decisions.

Problem 3: Comparative advantage

Two countries, Home and Foreign, produce only shirts and laptops using labor
Unit labor requirements (hours per unit) are

	Shirts	Laptops
Home	2	10
Foreign	4	12

- (a) Compute Home's opportunity cost of 1 laptop in terms of shirts
- (b) Compute Foreign's opportunity cost of 1 laptop in terms of shirts
- (c) Which country has comparative advantage in laptops and which has comparative advantage in shirts?
- (d) If Home specializes in laptops and Foreign specializes in shirts, give a feasible terms of trade range in shirts per laptop that makes both better off.

Problem 4: Quotas

Domestic demand and supply for steel are

$$Q_D = 80 - P$$
$$Q_S = 5 + 0.5P$$

The world price is

$$P_w = 30$$

The country is a small importing country

- (a) Under free trade, compute domestic Q_D , domestic Q_S , and imports
- (b) A tariff of $t = 10$ is imposed. Compute the new domestic price, new Q_D , new Q_S , and new imports
- (c) Compute the tariff revenue
- (d) Compute deadweight loss from the tariff
- (e) Now replace the tariff with an import quota that restricts imports to the same level as in part (b). Compute the quota rent
- (f) Compute the welfare loss under the quota if quota rents are captured by the domestic government
- (g) Compute the welfare loss under the quota if quota rents are captured by foreign exporters

Week 7: practice problems

ECON 1-01

TA: Allegra Saggese
Date: February 17, 2026

Professor: KC Fung
Topic: Chapter 10-11

We will cover the principles of rationality in decision making choices by individuals, particularly in the long and short run. We will also cover the information we have worked with around the supply curve, and unpack this further. Questions were adapted from Krugman & Wells, the content provided by KC Fung in lecture slides, and ChatGPT manipulation of numbers.

Problem 0: Budget line

A consumer has income $I = 120$. The price of good x is $P_x = 6$ and the price of good y is $P_y = 4$.

- Write the equation of the budget line.
- Find the x -intercept and y -intercept.
- Explain in words what the slope of the budget line represents economically.
- Suppose income rises to $I = 180$ while prices remain unchanged. Write the new budget equation and explain how and why the budget line shifts.
- Suppose instead that P_x falls to 3 while income and P_y remain unchanged. Write the new budget equation and explain how and why the budget line pivots.

Problem 1: Marginal utility

A consumer chooses between two goods, x and y . She has fixed income and faces given prices P_x and P_y . Suppose at her current bundle it is true that

$$\frac{MU_x}{P_x} > \frac{MU_y}{P_y}$$

- Explain in words what $\frac{MU_x}{P_x}$ represents. Interpret the economic condition.
- If $\frac{MU_x}{P_x} > \frac{MU_y}{P_y}$ at the chosen bundle, explain how the consumer could increase total utility without increasing income. Be specific about how she would reallocate spending.
- Explain why a bundle where $\frac{MU_x}{P_x} \neq \frac{MU_y}{P_y}$ cannot be optimal.
- The marginal rate of substitution (MRS) is defined as the slope of the indifference curve:

$$MRS = \frac{MU_x}{MU_y}$$

Explain why the utility-maximizing condition

$$\frac{MU_x}{P_x} = \frac{MU_y}{P_y}$$

is equivalent to the rule

$$MRS = \frac{P_x}{P_y}$$

- (e) Explain in words what it means economically for the slope of the indifference curve to equal the slope of the budget line.

Problem 2: Income and substitution effect

Suppose a consumer consumes only coffee and tea. Coffee is a normal good. Initially:

$$P_C = 4, \quad P_T = 2$$

Then the price of coffee falls to $P_C = 2$.

- (a) Explain how the substitution effect after the price decrease affects the optimal consumption of both goods.
- (b) Explain how the income effect after the price decrease affects the optimal consumption of both goods.
- (c) Explain why both effects work in the same direction for a normal good.
- (d) Now suppose coffee is an inferior good. Explain why the income and substitution effects work in opposite directions.
- (e) Under what condition would coffee become a Giffen good?

Problem 3: Short run costs

A firm has fixed cost $FC = 200$. Its variable cost function is:

$$VC(Q) = 10Q + Q^2$$

- (a) Write the total cost function.
- (b) Explain why AFC is always downward sloping.
- (c) Explain why AVC is U-shaped.
- (d) Explain why ATC is also U-shaped using the relationship

$$ATC = AFC + AVC$$

Problem 4: Marginal costs

Using the total cost function from Problem 3:

$$TC(Q) = 200 + 10Q + Q^2$$

- (a) Write the marginal cost function.
- (b) Find the output level where marginal cost equals average total cost.
- (c) Explain why the marginal cost curve intersects the ATC curve at its minimum.
- (d) Suppose the wage rate rises, increasing the coefficient on Q from 10 to 20. Explain what happens to MC and ATC.

Problem 5: Diminishing marginal returns

A firm's production function in the short run is:

$$Q = 20L - L^2$$

where L is labor and capital is fixed.

- (a) Compute the marginal product of labor.
- (b) At what level of labor does marginal product begin to decline?
- (c) Explain in words what diminishing marginal returns means.
- (d) Explain how diminishing marginal returns lead to an upward-sloping marginal cost curve.
- (e) Explain why diminishing marginal returns occur only in the short run.

Week 9: practice problems

ECON 1-01

TA: Allegra Saggese
Date: March 2, 2026

Professor: KC Fung
Topic: Monopoly, oligopoly

These questions cover perfect competition, monopoly, and monopolistic competition. Focus on marginal analysis, profit maximization, and efficiency comparisons across market structures. They focus on monopoly, oligopoly, and monopolistic competition. Corresponds to Chapter 12-14 in Krugman & Wells.

Problem 0: Perfect Competition

A perfectly competitive firm faces market price $P = 25$. Its total cost function is:

$$TC(Q) = 50 + 5Q + Q^2$$

- Derive the marginal cost function and determine the profit-maximizing level of output.
- Calculate the firm's economic profit at the profit-maximizing output.
- Explain what will happen in the long run if firms in this industry are earning positive economic profits.

Problem 1a: What are monopolies?

Answer the following questions about monopolies:

- What is a monopoly?
- What are the five key barriers to entry in a market that allows a monopoly to thrive?
- Can you come up with an example of a monopoly in the current US economy? Why do you believe it is a monopoly? On what basis can we *assess or prove* the existence of a monopoly?
- Provide an example of a firm or service that is potentially a **natural monopoly**, such that consumers actually benefit from having one firm selling a good or providing service. Through what economic phenomena are natural monopolies not inefficient?

Problem 1b: Solving for monopoly

A monopolist faces the inverse demand curve:

$$P = 60 - 2Q$$

Marginal cost is constant:

$$MC = 20$$

- (a) Derive the marginal revenue function and determine the profit-maximizing quantity.
- (b) Find the monopoly price and compute the monopolist's profit.
- (c) Compare the monopoly outcome to the perfectly competitive outcome. Explain why monopoly creates deadweight loss.

Problem 2: Monopolistic Competition

Suppose a firm in monopolistic competition faces the demand curve:

$$P = 40 - Q$$

Its total cost function is:

$$TC(Q) = 10 + 10Q$$

- (a) Derive the marginal revenue function and determine the short-run profit-maximizing output.
- (b) Calculate the firm's economic profit in the short run.
- (c) Explain what happens in the long run under free entry and why monopolistically competitive firms exhibit excess capacity.

Problem 3: Oligopoly

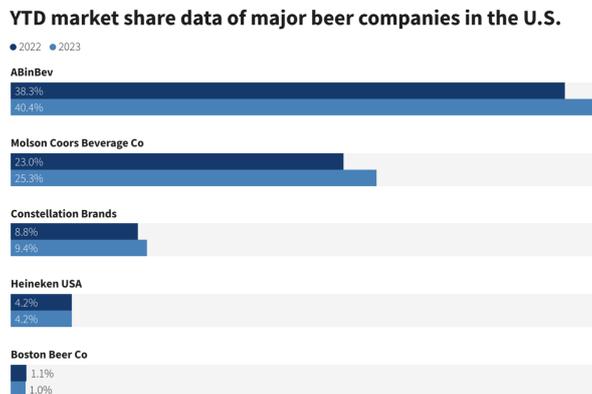


Figure 1: Beer market concentration, updated from Krugman & Wells Figure 14-1

Given the market is quite concentrated, we may characterize this market as an oligopoly. Do the following:

- (a) Give a definition of oligopoly.
- (b) Explain what imperfect competition is, and how oligopolists may operate within an imperfectly competitive market.

- (c) Give one example of how the government may use public policy to intervene in this market.
- (d) Give one example of how firms try to make profit under these conditions (*use game theory in your answer*).

Problem 4: Overview

Define the following four types of markets:

1. Perfectly competitive
2. Monopolistic competition
3. Monopoly
4. Oligopoly

Final Exam Review Worksheet

ECON 1-01

TA: Allegra Saggese
Date: March 9, 2026

Professor: KC Fung
Topic: Final Exam Review

These questions were designed with the help of AI (ChatGPT). The questions are also based on KC Fung's lecture slides and Krugman & Wells, primarily chapters 11-14.

Problem 0: Elasticities

The price of sushi increases from \$10 to \$12 and the quantity demanded falls from 100 to 80.

- Calculate the price elasticity of demand using the midpoint formula.
- Is demand elastic, inelastic, or unit elastic?
- Explain what happens to total revenue when demand is elastic and price increases.

Problem 1: Cross-price elasticity

Consumers consider coffee and tea substitutes.

- What sign should the cross-price elasticity have?
- Explain why the sign of cross-price elasticity indicates whether goods are substitutes or complements.
- If the price of coffee increases, what happens to the demand for tea?

Problem 2: Monopoly

A monopolist faces demand:

$$P = 80 - 2Q$$

Marginal cost is:

$$MC = 20$$

- Derive the marginal revenue curve.
- Find the profit maximizing quantity.
- Find the monopoly price.

Problem 3: Monopoly vs perfect competition

Consider the market in Problem 2.

- (a) Calculate the perfectly competitive output level.
- (b) Explain why monopoly produces less output than perfect competition.
- (c) Explain what deadweight loss represents in this context.

Problem 4: Perfect competition

A competitive firm faces price $P = 20$ and has cost:

$$TC = 100 + 5Q + Q^2$$

- (a) Derive the marginal cost function (using the first derivative) or state in words what the function is.
- (b) Find the profit maximizing output.
- (c) Calculate economic profit.

Problem 5: Oligopoly

- (a) Define oligopoly.
- (b) Explain what interdependence means in an oligopolistic market.
- (c) Explain why oligopolists may engage in tacit collusion.

Problem 6: Game theory in imperfect competition

Two firms choose either to collude or compete.

- (a) Define a Nash equilibrium.
- (b) Explain why firms may end up competing even if collusion is more profitable.
- (c) Explain how repeated interaction can help sustain cooperation.

Problem 7: Trade

Suppose the government imposes a tariff on imported steel.

- (a) What happens to domestic consumer surplus?
- (b) What happens to domestic producer surplus?
- (c) Explain why tariffs create deadweight loss.

Problem 8: Taxation

An excise tax is imposed on a good.

- (a) Explain how a tax affects the equilibrium price and quantity.
- (b) Define deadweight loss from taxation.
- (c) Explain why taxes generate larger deadweight losses when demand is elastic.

Problem 9: Environmental externalities

A factory produces pollution that harms nearby residents.

- (a) Define a negative externality.
- (b) Explain why markets may produce inefficient outcomes when externalities exist.
- (c) Describe one policy that can reduce pollution efficiently.

Final Exam Review (all sections)

ECON 1-01

TA: Allegra Saggese
Date: March 10, 2026

Professor: KC Fung
Topic: Market structures

These questions review monopoly, monopolistic competition, perfect competition, and oligopoly. They emphasize profit maximization, demand curves, cost curves, market power, strategic behavior, and government policy. These questions were produced with the help of ChatGPT, and are based off of KC Fung's lecture slides (2026).

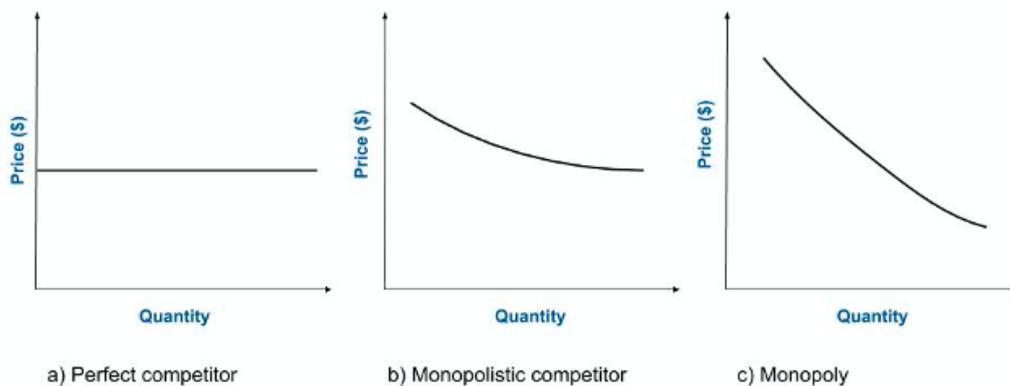
Markets review:

Feature	Perfect Competition	Natural Monopoly
P^* choice	Price taker; firm accepts market price	Price setter due to economies of scale
π max condition	$P = MR = MC$	$MR = MC$ (regulated cases may impose $P = ATC$ or $P = MC$)
D_1 slope	Horizontal (perfectly elastic)	Downward sloping
Efficiency	None; allocatively efficient	Deadweight loss if unregulated
Response in SR	Produce where $P = MC$ if $P \geq AVC$; profits or losses possible	Choose output where $MR = MC$
Response in LR	Entry and exit drive profits to zero	Entry prevented by cost structure (large fixed costs)
LR econ π	Driven to zero, no new entrants after this point	Positive, unless regulated
Firm response	Cost minimization and productive efficiency	Pricing strategies subject to regulation
Gov't response	No intervention because the market is maximizing profits, such that there is no DWL and consumers and producers get some surplus.	Two ways for government to regulate a natural monopoly: price regulation (set the price) or public ownership (i.e. take control of the firm)

Feature	Monopoly	Monopolistic Competition	Oligopoly
P^* choice	Price setter	Price setter with limited market power	Price setter with strategic interaction
π max condition	$MR = MC$, price chosen from demand curve	$MR = MC$, price from demand curve	$MR = MC$, but depends on rivals' strategies
D_1 slope	Downward sloping	Downward sloping (relatively elastic)	Downward sloping; may be kinked
Efficiency	Deadweight loss from underproduction. Monopolists always produce $Q_m < Q_{competitive}$	Small deadweight loss possible	Potential deadweight loss depending on collusion
Response in SR	Choose output where $MR = MC$	Choose output where $MR = MC$	Strategic pricing or output decisions
Response in LR	Entry blocked by barriers	Entry shifts demand left until profits disappear	Entry limited by barriers to entry
LR econ π	Positive π possible	Zero economic profit	Possible positive π if barriers to entry exist
Firm response	Price discrimination, output restriction	Product differentiation, advertising	Collusion, price leadership, game theory strategies
Gov't response	Antitrust regulation	Usually minimal intervention	Antitrust enforcement and merger review (HHI)

Problem 0: Market structures and demand curves

Consider the three demand curves shown below.



- Identify which graph corresponds to a perfectly competitive firm, a monopolistically competitive firm, and a monopolist. Explain your reasoning.
- Explain why the demand curve facing a perfectly competitive firm is horizontal.
- Explain why monopolists and monopolistically competitive firms face downward-sloping demand curves.

Problem 1: Profit maximization

Consider a firm that sells a differentiated product.

- (a) Explain how firms determine the profit-maximizing level of output using the condition

$$MR = MC$$

- (b) Define the following concepts and explain how they are related to profits:

$$TR, TC, ATC, FC, VC$$

- (c) Suppose the firm produces where $MR = MC$ but finds that

$$P < ATC$$

Explain what this means for economic profit.

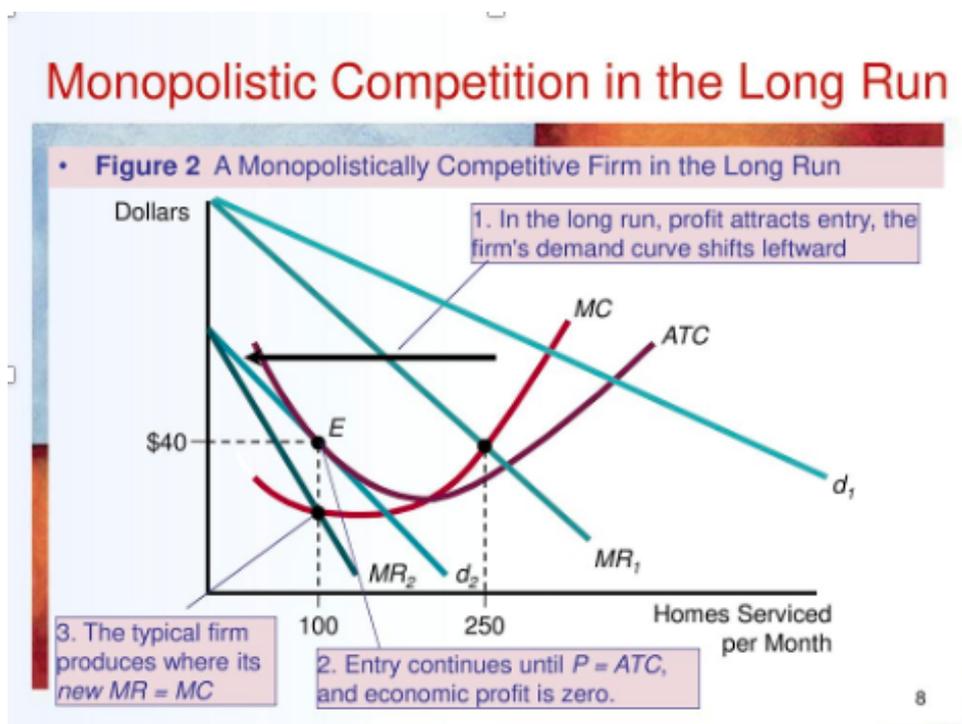
Problem 2: Monopoly behavior

A monopolist always faces a downward-sloping demand curve.

- (a) Explain why marginal revenue lies below the demand curve.
(b) Compare the monopoly outcome to the perfectly competitive outcome in terms of price and quantity.
(c) Explain why monopoly creates deadweight loss.

Problem 3: Monopolistic competition in the long run

Consider the diagram below.



- (a) Explain why economic profits attract entry of new firms.
- (b) Explain why the firm's demand curve shifts leftward when entry occurs.
- (c) In long-run equilibrium explain why

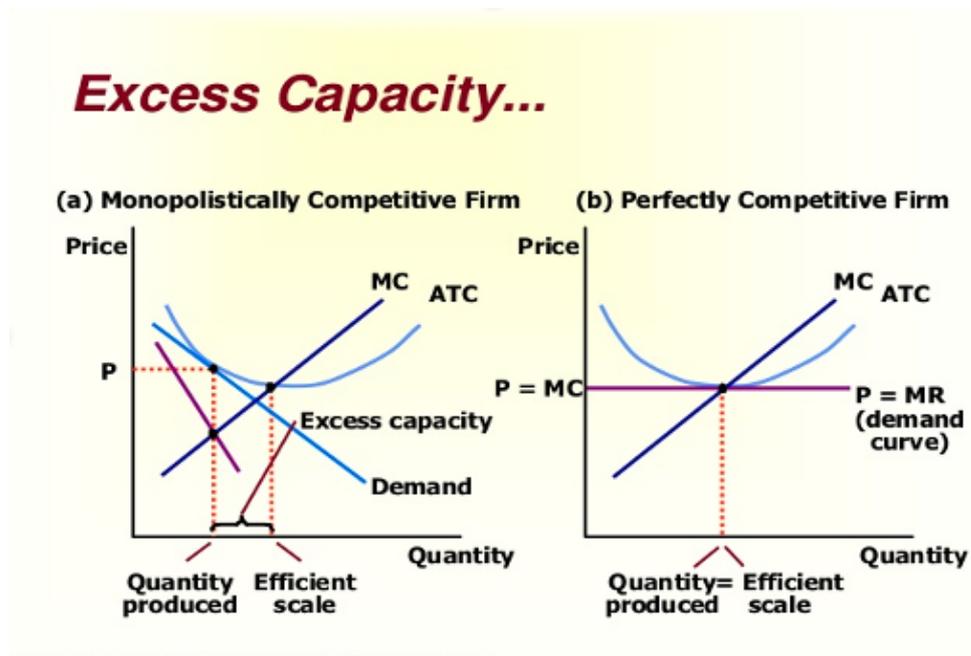
$$P = ATC$$

yet

$$P > MC$$

Problem 4: Excess capacity

Consider the figure below comparing monopolistic competition and perfect competition.



- (a) Define excess capacity.
- (b) Explain why monopolistically competitive firms produce less than the efficient scale.
- (c) Explain why perfectly competitive firms produce at the minimum of the average total cost curve.

Problem 5: Price discrimination

A monopolist can practice perfect price discrimination.

- (a) Define perfect price discrimination.
- (b) Explain why perfect price discrimination eliminates deadweight loss.
- (c) Explain how price discrimination affects consumer surplus and producer surplus.

Problem 6: Herfindahl-Hirschman Index

Suppose an industry has four firms with market shares:

$$Firm_A : 40\%, Firm_B : 30\%, Firm_C : 20\%, Firm_D : 10\%$$

- (a) Compute the Herfindahl-Hirschman Index (HHI).
- (b) Explain what the HHI measures.
- (c) Explain how antitrust authorities use the HHI to evaluate mergers.

Problem 7: Oligopoly and strategic behavior

Consider an oligopolistic industry.

- (a) Define oligopoly and explain why firms are strategically interdependent.
- (b) Explain why firms may attempt tacit collusion.
- (c) Explain why collusion may break down using the prisoner's dilemma intuition.

Problem 8: Network externalities

Digital platforms such as TikTok or Instagram often exhibit network effects.

- (a) Define network externality.
- (b) Explain why network effects can create market power.
- (c) Explain why first-mover advantage may arise in such markets.

Problem 9: Taxes and deadweight loss

Suppose a government imposes an excise tax on a market.

- (a) Explain how the tax affects consumer surplus, producer surplus, and government revenue.
- (b) Explain what deadweight loss represents.
- (c) Explain why deadweight loss becomes larger when demand is more elastic.