



金程教育
GOLDEN FUTURE

可信赖的财经培训专家

CFA一级培训项目

Economics

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个人简介

教育背景和资历：中国科学技术大学应用物理学学士、复旦大学经济学硕士；CFA、FRM持证人。

任教课程：经济学、固定收益、衍生品；累计授课时间CFA一级超过20班次，CFA三级超过10班次。

工作背景：某排名前5的证券公司投资银行部从事项目审核工作，目前主要负责投行项目中固定收益项目、并购项目的审核工作。熟悉主要的债券和并购业务，参与审核的债券项目类型包括企业债券、公司债券、中小企业私募债、中小企业集合债、短期融资券、中期票据、银行间市场私募债、商业银行二级资本债；参与审核的并购项目包括财务咨询、发行股份购买资产、股权激励等。

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Topic Weightings in CFA Level I

Session NO.	Content	Weightings
Study Session 1	Ethics & Professional Standards	15
Study Session 2-3	Quantitative Analysis	12
Study Session 4-6	Economics	10
Study Session 7-10	Financial Reporting and Analysis	20
Study Session 11	Corporate Finance	8
Study Session 12	Portfolio Management and Wealth Planning	5
Study Session 13-14	Equity Investment	10
Study Session 15-16	Fixed Income	12
Study Session 17	Derivatives	5
Study Session 18	Alternative Investments	3

Framework of Economics

➤ SS 4 Microeconomic Analysis

- R13 demand and supply: introduction
- R14 demand and supply: consumer demand introduction
- R15 demand and supply: the firm
- R16 the firm and the market structure

➤ SS 5 Macroeconomic Analysis

- R17 aggregate output, price, and economic growth
- R18 understand business cycles
- R19 monetary and fiscal Policy

➤ SS 6 Economics in a Global Context

- R20 international trade and capital flow
- R21 currency exchange rate

R13 Demand and Supply: Introduction

- Types of markets
- Demand & Supply model
 - Auctions
- Consumer & Producer surplus
- Market interference
- Elasticity

R13 Types of Markets

- Goods markets: for output of production (finished goods & services)
 - buyer: households firm
 - seller: firm
- Intermediate goods: used in the production of final goods
 - eg: computer chips
- Factor markets: for factors of production
 - buyer: firm
 - seller: households
 - ✓ eg: land, labor, physical capital, materials
- Capital markets: used by firms to sell debt or equity to raise long-term capital to finance the production

R13 Demand

➤ The Demand Function

- the quantity of demanded depends on income, the prices of other goods, as well as other factors
- $Q^d_x = f(p_x, I, p_y \dots)$

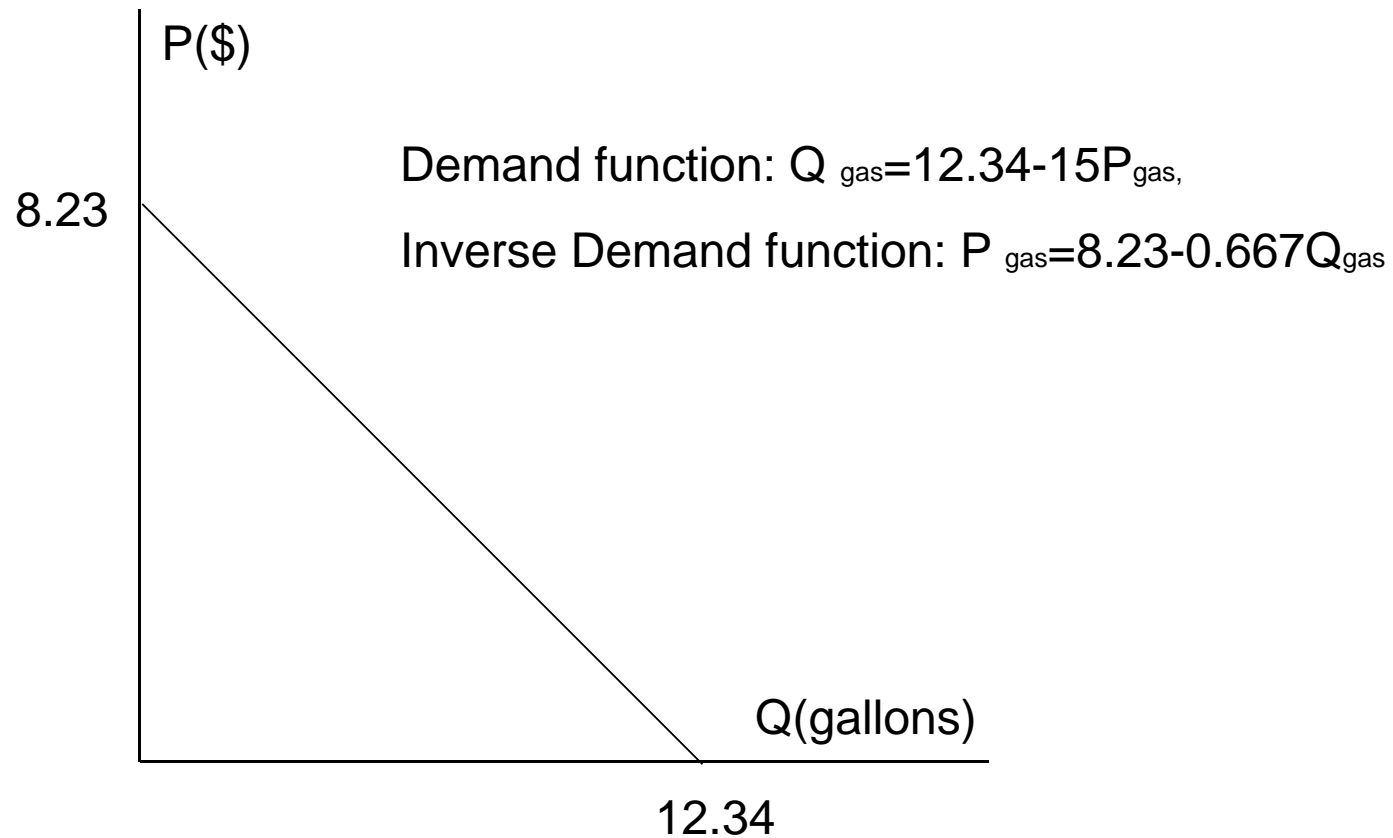
➤ Example:

- $Q_{D \text{ gas}} = 9 - 1.5P_{\text{gas}} + 0.02I + 0.11 P_{\text{BT}} - 0.008P_{\text{auto}}$ (BT:Bus Travel)
- Assuming $I=40$, $P_{\text{BT}}=25$, $P_{\text{auto}}=26$
 - ✓ $Q_{D \text{ gas}} = 12.34 - 1.5P_{\text{gas}}$ (demand function)
- Invert the function
 - ✓ $P_{\text{gas}} = 8.23 - 0.667Q_{D \text{ gas}}$ (inverse demand function)
 - ✓ The graph of the inverse demand function is called the demand curve.
 - ✓ The slope of demand curve is -0.667.

➤ Law of Demand

- ✓ demand decreased as the price increased

R13 Demand Curve



R13 Supply

➤ The Supply Function

- The quantity supply depends on the selling price, the costs of production depending on technology, the cost of labor, and the cost of other inputs into the production process.

- $Q^s_x = f(P_x, W, \dots)$

➤ Example:

- $Q^s_{\text{tables}} = -300 + 1.5P_{\text{tables}} - 8W - 0.2P_{\text{wood}}$

- Assuming $W=12$, $P_{\text{wood}}=150$

- ✓ $Q^s_{\text{tables}} = -426 + 1.5P_{\text{tables}}$ (***Supply Function***)

- Invert the function

- ✓ $P_{\text{tables}} = 284 + 0.667Q_{\text{tables}}$ (***Inverse Supply Function***)

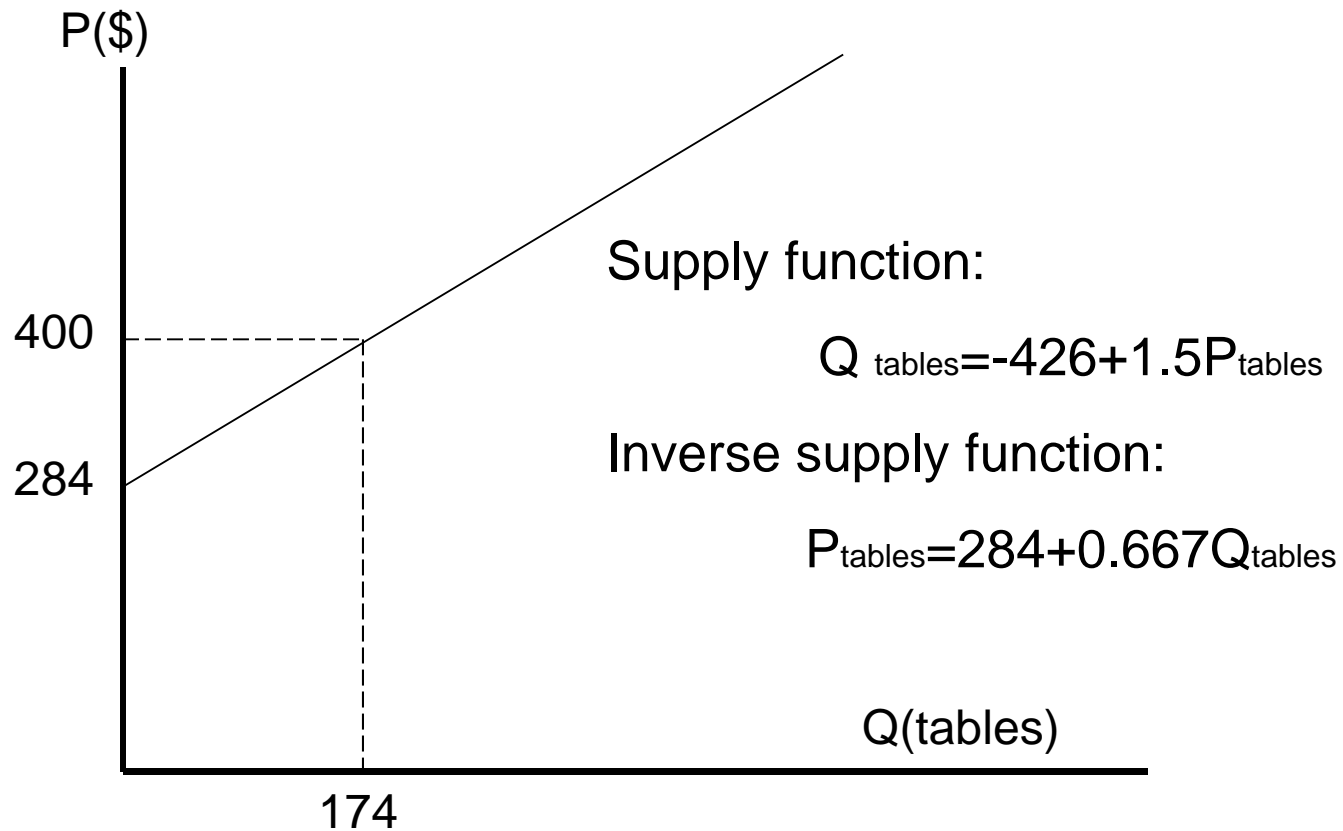
- ✓ The graph of the inverse supply function is called the ***supply curve***.

- ✓ The ***slope of the supply curve*** is 0.667.

➤ Law of supply

- ✓ supply increased as the price increased

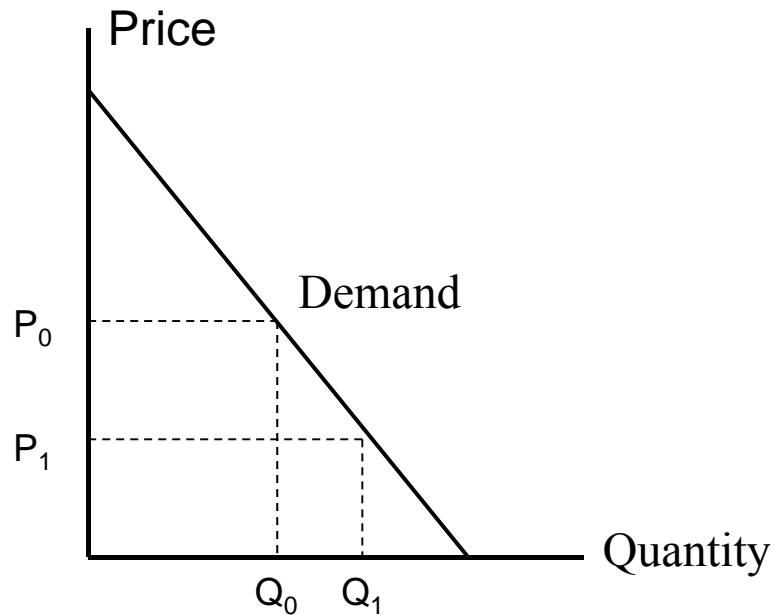
R13 Supply Curve



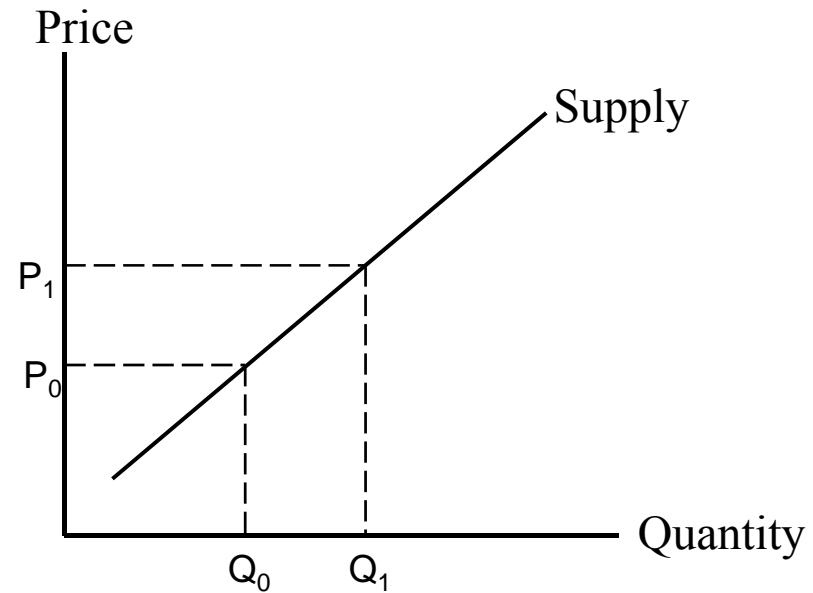
R13 Shifts in and Movements along Demand and Supply Curves

- **Movements along demand and supply curves.** 沿着需求（供给）曲线移动
 - A change in the market price that simply increases or decreases the quantity supplied or demanded is represented by a movement along the curve.
- **Shifts in demand and supply curves.** 需求（供给）曲线本身发生移动
 - A change in one of the independent variables other than price will result in a shift of the curve itself.

R13 Movements along Demand and Supply Curves

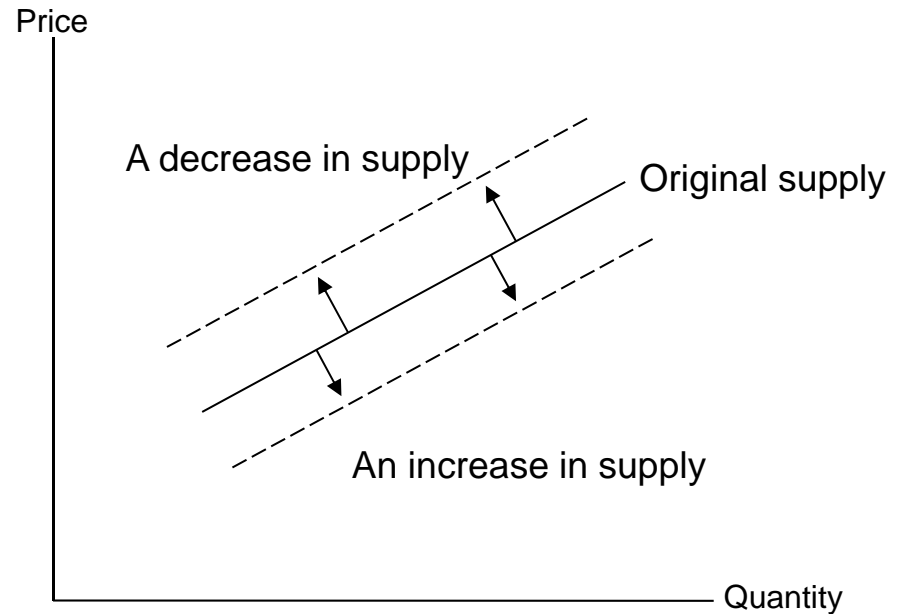
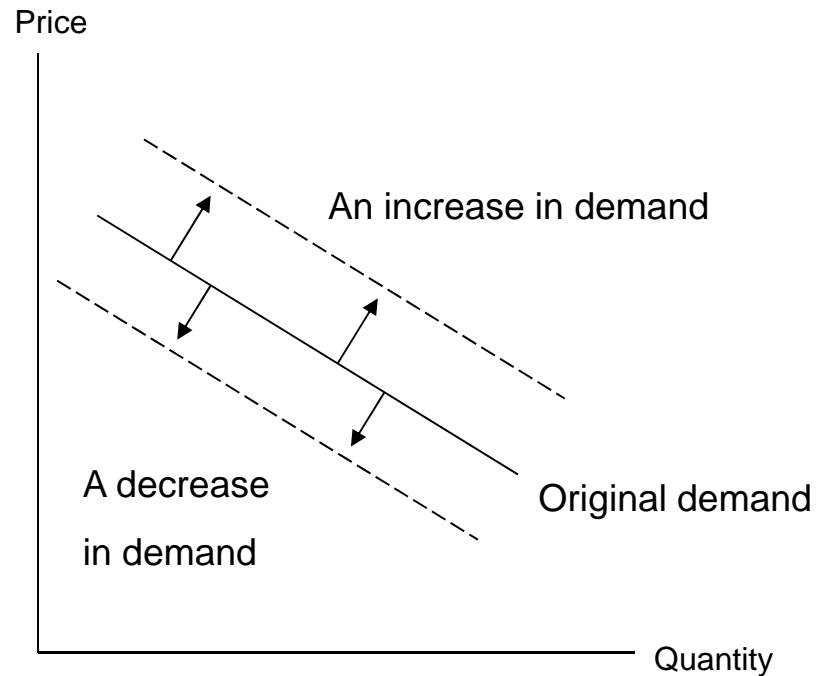


Change in Quantity Demand



Change in Quantity Supplied

R13 Shifts in Demand and Supply Curves



R13 Aggregating Demand and Supply Curves

➤ Aggregating demand and supply curves

- Add the firms that comprise market supply together to get the market supply function.
- Add the many individual demand curves to get the market demand function

➤ **Example:**

- An individual consumer's monthly demand for downloadable e-book is given by the equation $Q_{eb}^d = 2 - 0.4P_{eb} + 0.0005I + 0.15P_{hb}$
- Household income (I) is \$2,300, and the price of hardbound books (P_{hb}) is \$21.4.
- The market consists of 1,000 identical consumers with this demand function.
- Determine the market aggregate demand function.

➤ **Answer:**

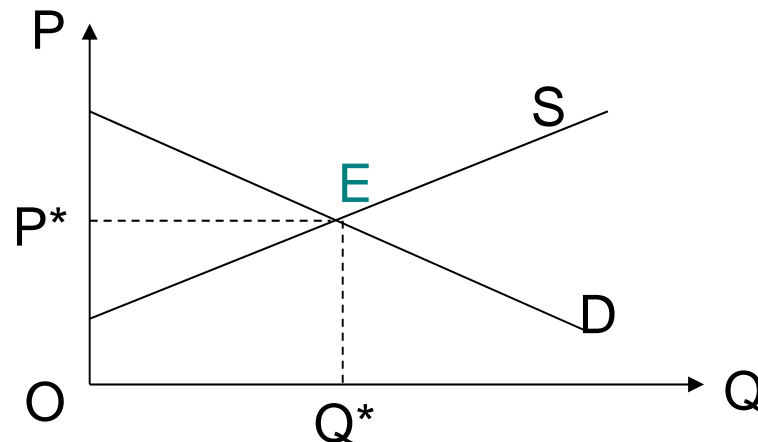
- Market demand is:

$$Q_{eb} = 1000(2 - 0.4P_{eb} + 0.0005I + 0.15P_{hb}) = 2,000 - 400P_{eb} + 0.5I + 150P_{hb}$$

R13 Market Equilibrium

➤ Equilibrium price and the equilibrium quantity

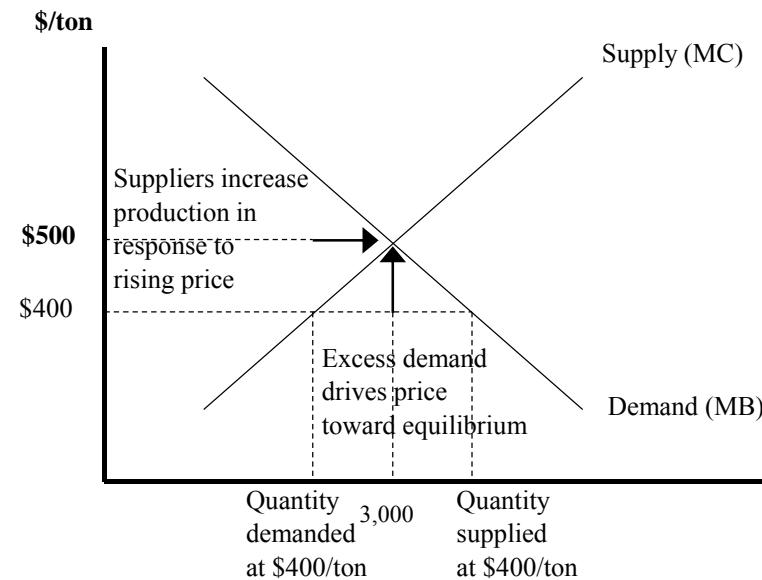
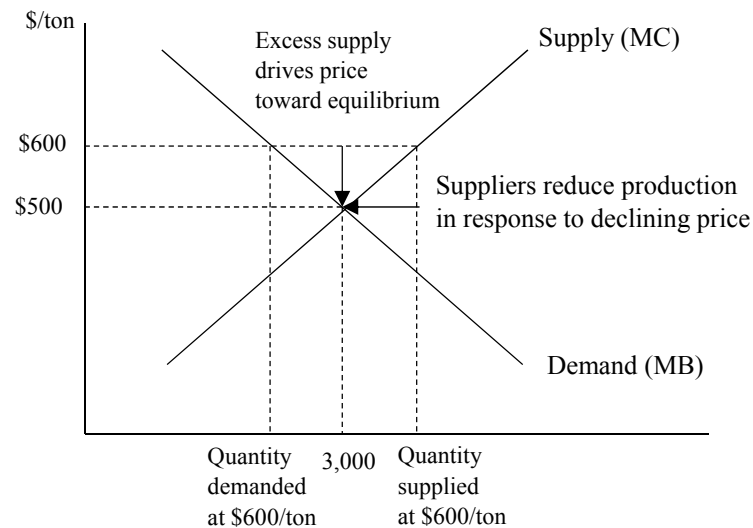
- When have a market supply and market demand curve for a good, we can solve for the price at which the quantity supplied equals the quantity demanded. We define this as the equilibrium price and the equilibrium quantity.



- E: market equilibrium. At the price, the quantity of supply=the quantity of demand.
- D: 买方对每个产量愿意支付的最高价格; S: 卖方对每个产量愿意出售的最低价格; E: 买方愿意支付的最高价格=卖方愿意出售的最低价格 (结合MB/MC分析)

R13 Movement toward Equilibrium

- If the price is above its equilibrium level, the quantity willingly supplied exceeds the quantity consumers are willing to purchase, and we have **excess supply**. Suppliers willing to sell at lower price will offer those prices to consumers, driving the market price down towards the equilibrium level.
- If the market price is below its equilibrium level, the quantity demanded at that price exceeds the quantity supplied, and we have **excess demand**. Consumers will offer higher prices to compete for the available supply, driving the market price up towards its equilibrium level.



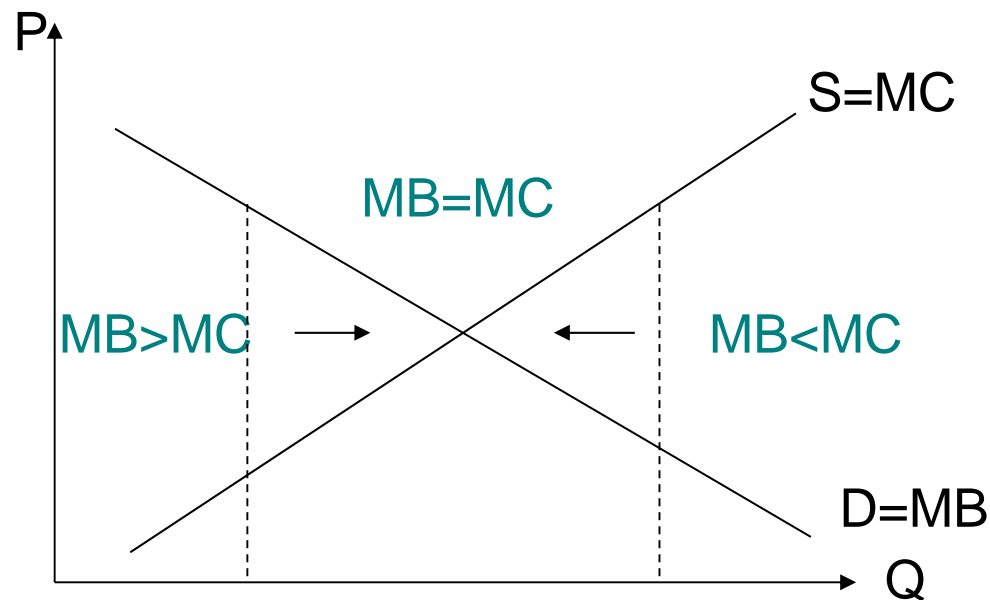
R13 Marginal Benefit and Marginal Cost

- Marginal benefit is the benefit derived from consuming one additional unit of a good or service
 - MB: to consumer
 - MB curve == Demand curve
- Marginal cost, the cost of producing one more unit of a good or service
 - MC: to producer
 - MC curve == Supply curve

R13 Marginal Benefit and Marginal Cost

Efficiency and Inefficiency

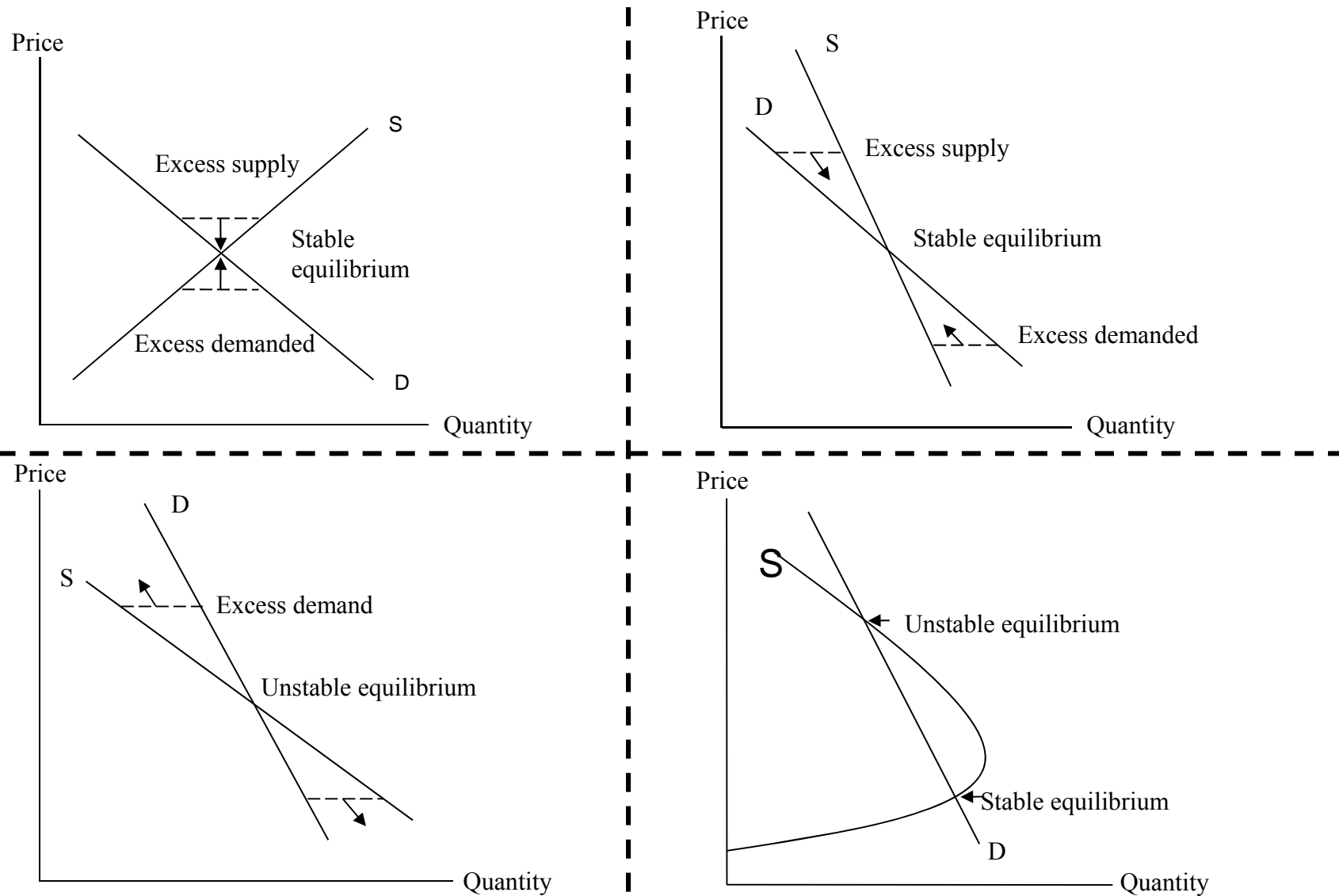
- When $MB > MC$ or $MB < MC$, the quantity is inefficient.
- When $MB=MC$, the quantity of good is efficient and the sum of consumer surplus and producers surplus is maximized.



R13 Stable and Unstable Equilibrium

- An equilibrium is called **stable** when there are forces that move price and quantity back towards equilibrium values when they deviate from those values
 - as long as supply curve cuts through the demand curve from above, the equilibrium will be stable
 - 供给曲线从上向下穿过（从上压住）需求曲线
- If the supply curve is less steeply sloped than the demand curve, and prices above (below) equilibrium will tend to get further from equilibrium. We refer to such an equilibrium as **unstable**.
 - 供给曲线从下向上穿过需求曲线

R13 Stable and Unstable Equilibrium



R13 Types of Auctions

- Auction is an alternative to markets for determining an equilibrium price.
- **Types of Auction:** Common value auction vs. Private value auction
 - common value auction
 - ✓ value of the item to be auctioned will be the same to any bidder
 - ✓ bidder must estimate what that value is
 - ◆ Like bidding on a jar containing many coins.
 - ✓ Winning bidder mostly overestimate the value
 - ◆ winner's curse
 - private value auction: The value that each bidder places on an item is the value it has to him, and we assume that no bidder will bid more than that.
(e.g., art, collectibles)

R13 Types of Auctions

➤ common type of auctions:

- *ascending price auction (English auction):*

- ✓ bidders can bid an amount greater than the previous high bid
- ✓ bidder that first offers the highest bid of the auction wins the item and pays the amount bid.
- ✓ Winner's curse: bid more than the ultimate value of the asset for common goods.

- *sealed bid auction*

- ✓ bids are elicited from potential buyers
- ✓ unable to observe bids by other buyers until the auction has ended.
- ✓ reservation price: the highest price that a bidder is willing to pay.

- *the first sealed bid auction*

- ✓ Bids are opened simultaneously and the item is sold to the highest bidder for the actual bid price.
- ✓ The highest bidder wins the auction, must pay full bid price. → winner's curse
- ✓ In recognition of the possibility of being overly optimistic, bidders might bid very conservatively below their expectation of the true value.

R13 Types of Auctions

- *second price sealed bid auction (Vickrey auction)*

- ✓ the bidder submitting the highest bid wins the item but pays the amount bid by the second highest bidder
- ✓ Vickrey auction and English auction are equivalent. Both of them could induce buyers to reveal their true valuation of the item.

- *descending price auction (Dutch auction)*

- ✓ begins with a price greater than what any bidder will pay, and this offer price is reduced until a bidder agrees to pay it.
- ✓ two variations: Modified Dutch auction & Single price auction
- ✓ **Modified Dutch auction**: winning bidders all pay the same price, which is the reservation price of the bidder whose bid wins the last units offered.
- ✓ **Single price auction** is used in selling U.S. Treasury securities.
 - ◆ But bidders may also submit a noncompetitive bid. Such a bid indicates that those bidders will accept the amount of Treasuries indicated at the price determined by the auction, rather than specifying a maximum price in their bids.
 - ◆ noncompetitive bid是指投标人只需对希望购买的国债份额进行投标，最终的中标价、中标数量由整个招标过程决定，是一种不用出价的投标方式，最终支付 competitive bidder决定的平均价

R13 Single Price Auction

➤ Example:

Auctioning Treasury Bills with a Single Price Auction

The U.S. Treasury offers to sell \$115 billion of 52-week T-bills and requests competitive and non-competitive bids. Non-competitive bids total \$10 billion, and competitive bidders in descending order of offer price are as given in the table below:

Discount Rate Bid (%)	Bid Price per \$100	Competitive Bids (\$ billions)	Cumulative Competitive Bids (\$ billions)	Non-competitive Bids (\$ billions)	Total Cumulative Bids (\$ billions)
0.1575	99.8425	12			
0.1580	99.8420	20			
0.1585	99.8415	36			
0.1590	99.8410	29			
0.1595	99.8405	5			
0.1600	99.8400	15			
0.1605	99.8395	10			

1. Determine the winning price if a single price Dutch auction is used to sell these T-bills.
2. For those bidders at the winning price, what percentage of their order would be filled?

R13 Single Price Auction

Solution to 1: Enter the non-competitive quantity of \$10 billion into the table. Then find the cumulative competitive bids and the total cumulative bids in the respective columns:

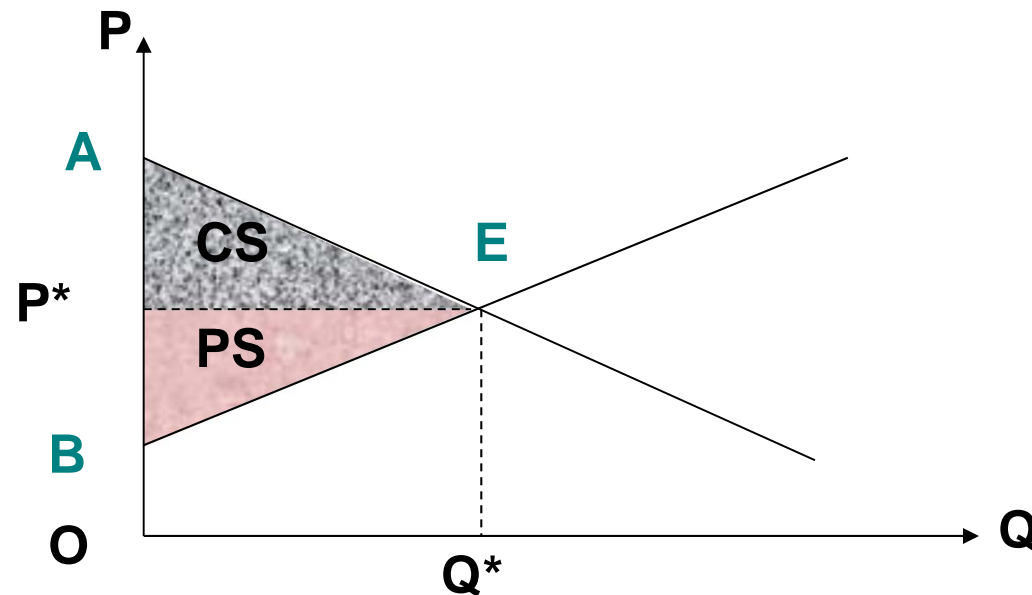
Bid Price Per \$100	Competitive Bids (\$ billions)	Cumulative Competitive Bids (\$ billions)	Non-competitive Bids (\$ billions)	Total Cumulative Bids (\$ billions)
99.8425	12	12	10	22
99.8420	20	32	10	42
99.8415	36	68	10	78
99.8410	29	97	10	107
99.8405	5	102	10	112
99.8400	15	117	10	127
99.8395	10	127	10	137

Note that at a bid price of 99.8400 there would be excess demand of \$12 billion (i.e., the difference between \$127 billion bid and \$115 billion offered), but at the higher price of 99.8405 there would be excess supply. So the winning bid would be at a price of 99.8400.

Solution to 2: At a price of 99.8400, there would be \$15 billion more demanded than at 99.8405 (\$127 billion minus \$112 billion), and at 99.8405 there would be excess supply equal to \$3 billion. So the bidders at the winning bid would have only 3/15, or 20 percent, of their orders filled.

R13 Consumer Surplus, Producer Surplus, and Total Surplus

- The difference between the total value to consumers of the units of a good that they buy and the total amount they must pay for those units is called consumer surplus
- Producer surplus is the excess of the market price above the opportunity cost of production
- Total surplus = consumer surplus + producer surplus



R13 Relationship between Consumer Surplus and Producer Surplus

- When the efficient quantity ($MB=MC$) is produced, the sum of consumer surplus and producer surplus is maximized. Buyers and sellers acting in their self-interest end up promoting the social interest.
- If the supply curve is steeper than the demand curve, more of the surplus is being captured by producers.
- If the demand curve is steeper, consumers capture more of the surplus.
- Total surplus is a measure of society's gain from the voluntary exchange of goods and services.

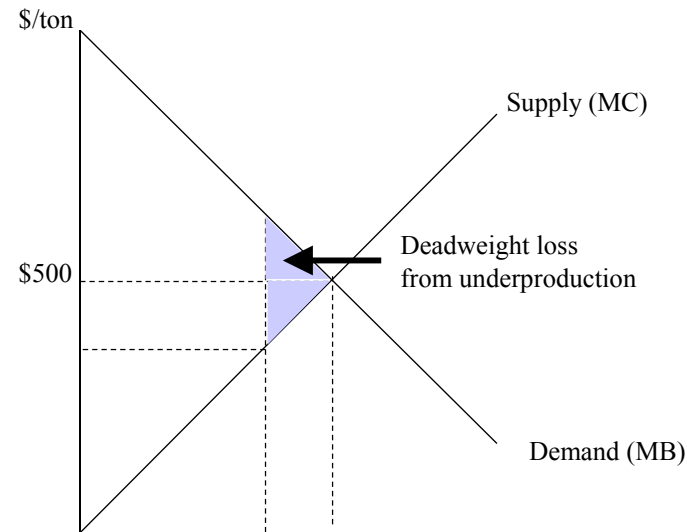
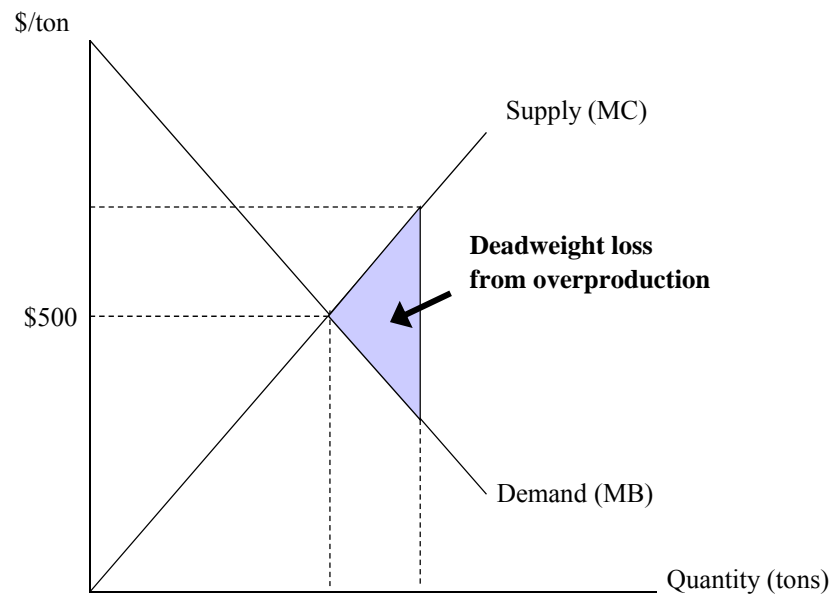
R13 Calculating Consumer and Producer Surplus

- Calculating Consumer and Producer Surplus when demand and supply are linear (assume: demand curve and supply curve have the same steepness.)
 - Example:
 - ✓ Demand function $Q = 48 - 3P$
 - ✓ $P=8 \quad Q=24$
 - ✓ the consumer surplus $= 1/2(8 \times 24) = 96$ units.
 - Example:
 - ✓ Supply function $Q = -24 + 6P$
 - ✓ $P=8 \quad Q=24$
 - ✓ The producer surplus $= 1/2(4 \times 24) = 48$

R13 Deadweight Loss

➤ Deadweight Loss

- The reduction in consumer and producer surplus due to underproduction or overproduction is called a **deadweight loss**.



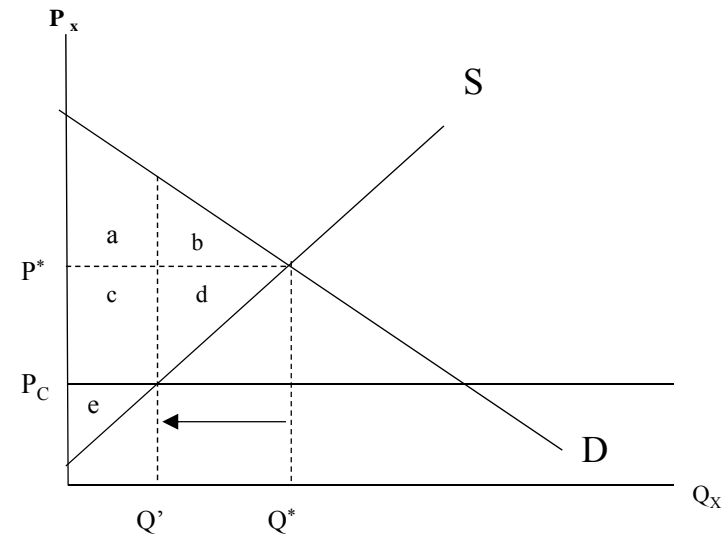
R13 Obstacles to Efficiency

➤ Obstacles to Efficiency

- Price controls: price ceiling (underproduction, e.g. rent control) and price floor (overproduction, e.g. minimum wage)
- Tax: buyers pay a higher price, sellers receive a lower price
- Subsidies: overproduction
- Quotas: underproduction
- Monopoly: underproduction
- External costs: overproduction, e.g. pollution
- External benefits: underproduction, e.g. forestation
- Public goods: underproduction, e.g. air, national defense
- Common resources: overproduction, e.g. timber, coal

R13 Price Ceiling

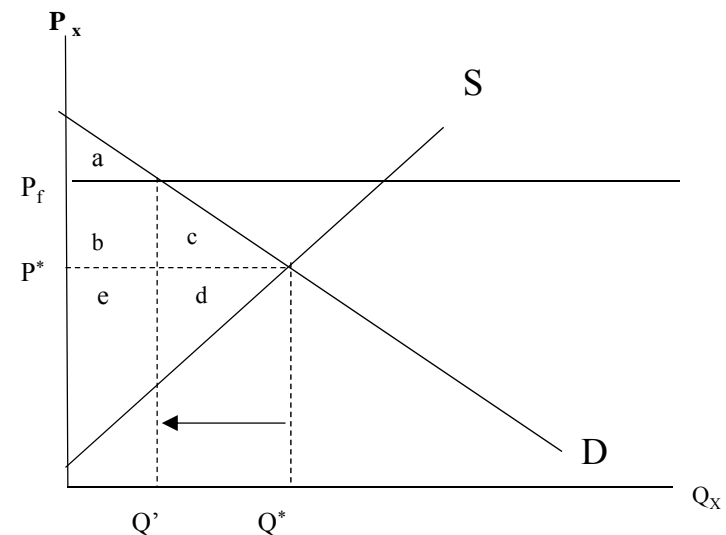
- A **price ceiling** is an upper limit on the price which a seller can charge. If the ceiling is above the equilibrium price, it will have no effect.
- **After imposition of a price ceiling at P_c**
 - Consumer surplus: $a+c$
 - Producer surplus: e
 - Deadweight loss: $b+d$
- **In the long run, price ceilings lead to inefficiencies:**
 - Consumers may have to wait in long lines to make purchases. They pay a price (an opportunity cost) in terms of the time they spend in line.
 - Suppliers may engage in discrimination, such as selling to friends and relatives first.
 - Suppliers “officially” sell at the ceiling price but take bribes to do so.
 - Suppliers may also reduce the quality of the goods produced to a level commensurate with the ceiling price.



Note: A price ceiling transfers surplus equal to area c from sellers to buyers, but it destroys surplus equal to area $b + d$, called a deadweight loss.

R13 Price Floor

- **Price floor** is a minimum price that a buyer can offer a good, service, or resource. If the price floor is below the equilibrium price, it will have no effect on equilibrium price and quantity.
- **After imposition of a price floor at P_f**
 - Consumer surplus: a
 - Producer surplus: b+e
 - Deadweight loss: c+d
- **In the long run, price floors lead to inefficiencies:**
 - Suppliers will divert resources to the production of the good with the anticipation of selling the good at the floor price, but will not be able to sell all they produce.
 - Consumers will buy less of a product if the floor is above the equilibrium price and substitute other less expensive consumption goods for the good subject to the price floor.



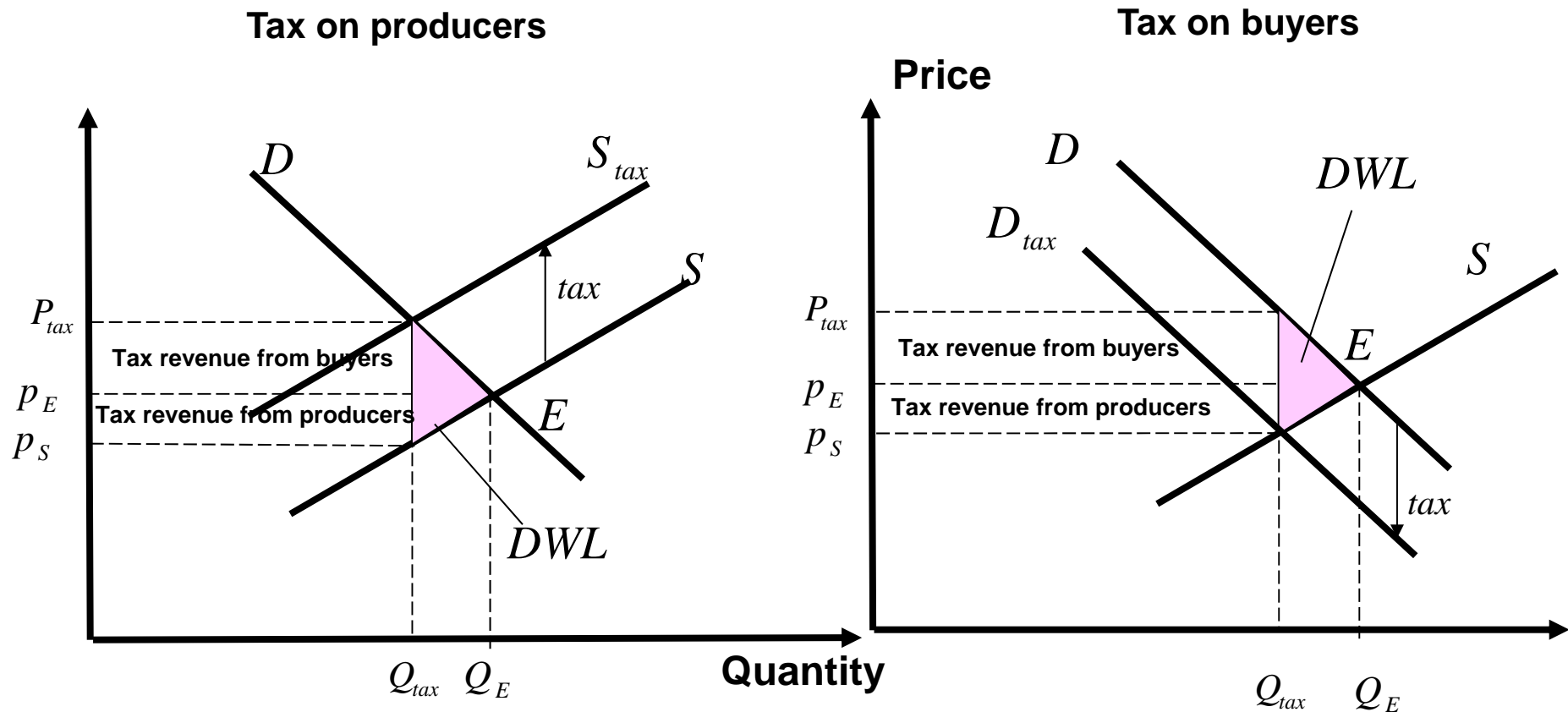
Note: A price floor transfers surplus equal to area b from buyers to sellers, but it destroys surplus equal to area c + d, called a deadweight loss

R13 Minimum wage

- The minimum wage in the United States is an example of price floor
 - minimum wage rate (*living wage*) prevents employers from hiring workers at a wage less than the legal minimum.
 - minimum wage > equilibrium wage will be an excess supply of workers
 - The result is increased unemployment because even when there are workers willing to work at a wage lower than the minimum, firms cannot legally hire them.
 - Firms may decrease the quality or quantity of the nonmonetary benefits they previously offered to workers, such as pleasant, safe working conditions and on-the-job training

R13 Impact of Taxes

- The incidence of a tax is allocation of this tax between buyers and sellers.

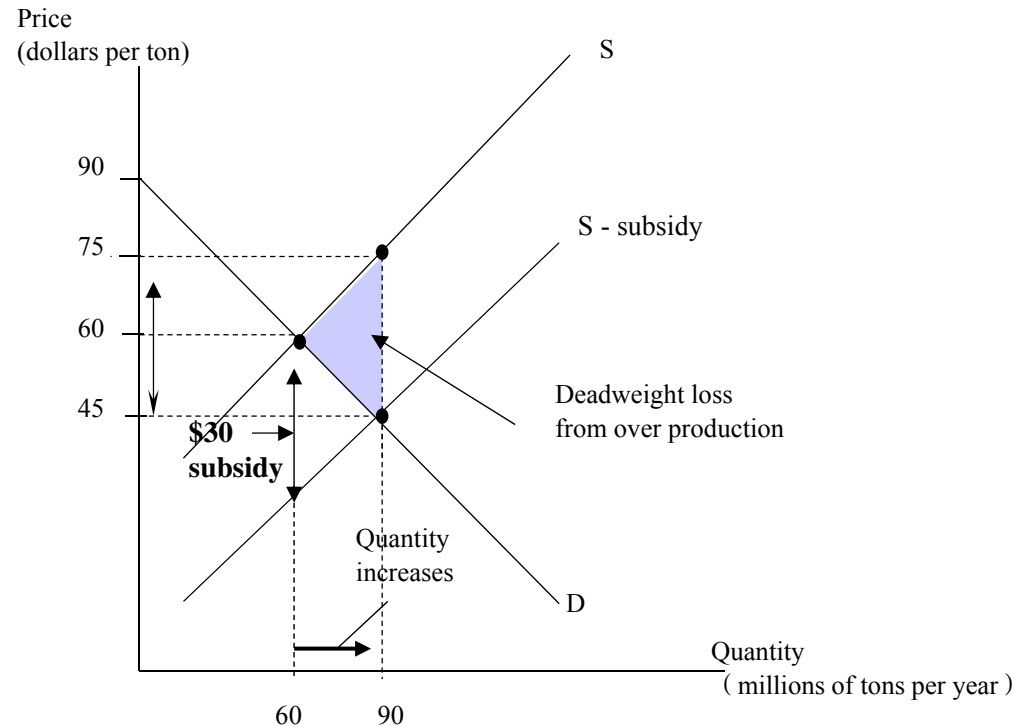


R13 Impact of Taxes

- Actual and Statutory Incidence of a Tax
 - **Statutory incidence**: who is legally responsible for paying the tax.
 - The **actual incidence** of a tax refers to who actually bears the cost of the tax through an increase in the price paid (buyers) or decrease in the price received (sellers)
- Tax on producers:
 - Statutory incidence: sellers
 - Actual incidence: sellers and buyers
- Tax on buyers:
 - Statutory incidence: buyers
 - Actual incidence: buyers and sellers

R13 Subsidies

- Subsidies are payments made by governments to producers, often farmers.

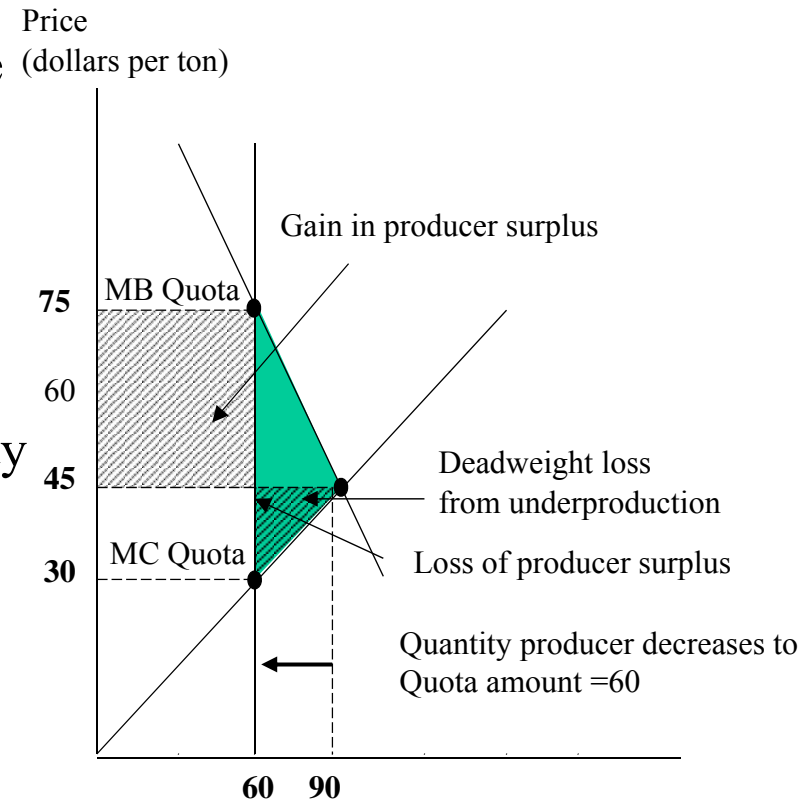


- After imposition of subsidies, supply will increase, which lead to an increase in quantity, overproduction.
- Buyers will pay a lower price. Sellers will receive a higher price.

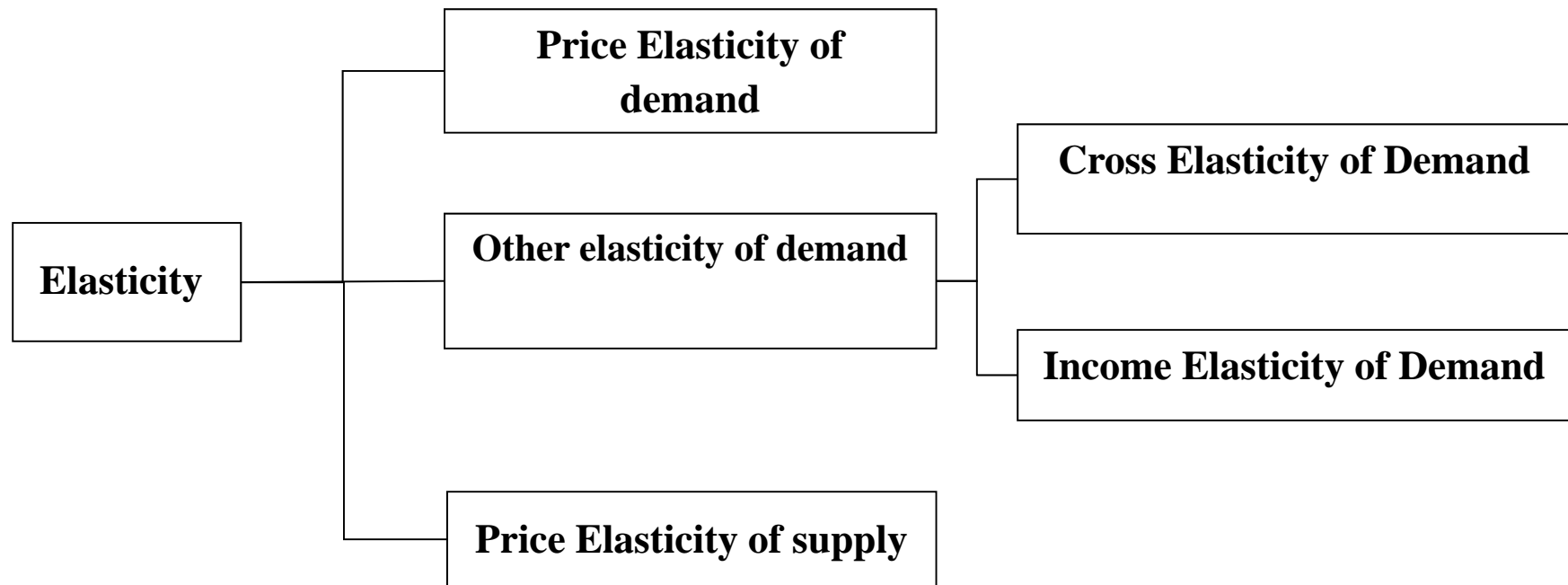
R13 Quotas

➤ **Production quotas** are used to regulate markets by imposing an upper limit on the quantity of a good that may be produced over a specified time period. Quotas are often used by governments to regulate agricultural markets.

- After imposition of quotas, the quantity will decrease, underproduction.
- Buyers will pay a higher price.
- At the quota amount, marginal benefit (price) exceeds marginal cost. This explains why producers often seek the imposition of quotas.



R13 Elasticity



R13 Price Elasticity of Demand

- **Price elasticity** is a measure of the responsiveness of the quantity demanded to a change in price.
- The formula used to calculate the price elasticity of demand is :

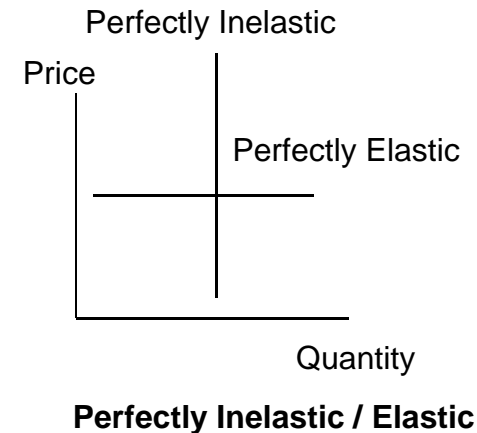
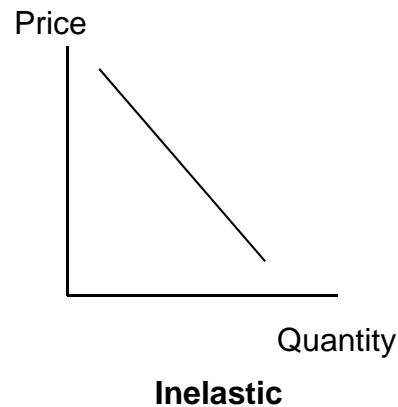
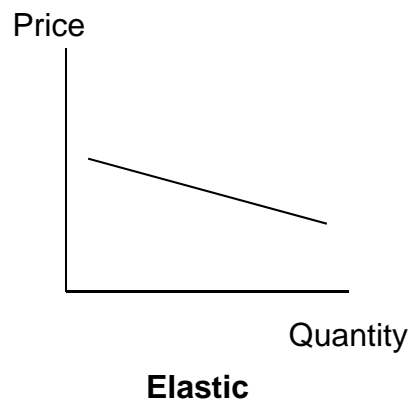
$$\text{price elasticity of demand} = \frac{\text{percent change in quantity demand}}{\text{percent change in price}} = \frac{\Delta Q / Q}{\Delta P / P}$$

where:

$$\text{percent change} = \frac{\text{change in value}}{\text{average value}} = \frac{\text{ending value} - \text{beginning value}}{\left(\frac{\text{ending value} + \text{beginning value}}{2} \right)}$$

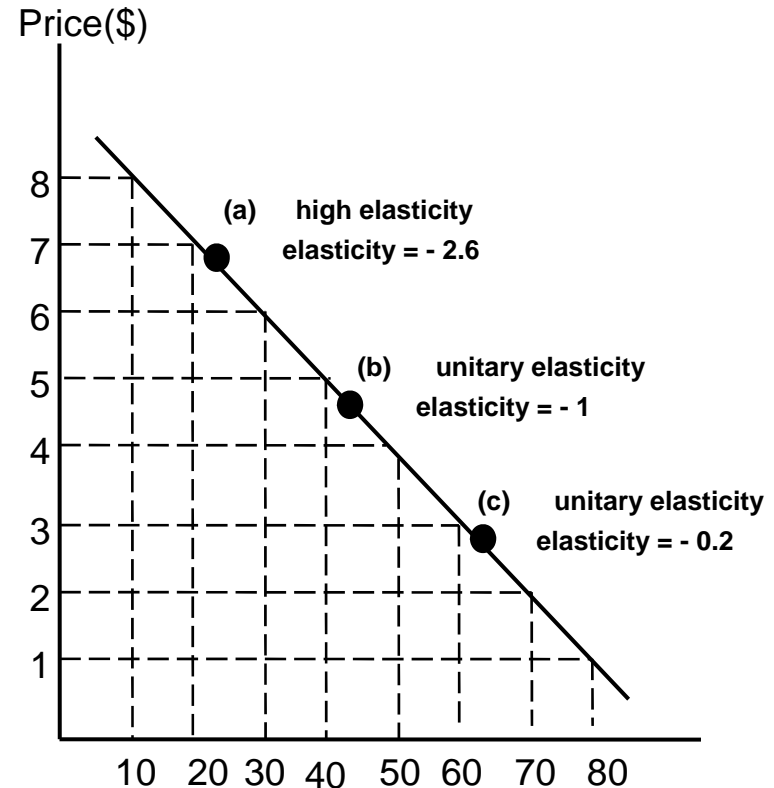
R13 Price Elasticity of Demand

- If a *small* percentage price change results in a *large* percentage change in quantity demanded, the demand for that good is said to be highly elastic. The absolute value of price elasticity is greater than one.
- If a *large* percentage price change results in a *small* percentage change in quantity demanded, demand is relatively inelastic. The absolute value of price elasticity is less than one.
- A perfectly elastic demand curve is horizontal, and its elasticity is infinite. If the price increases, quantity demanded goes to zero.
- A perfectly inelastic demand curve is vertical, and elasticity is zero. If the price changes, there will be no change in the quantity demand.



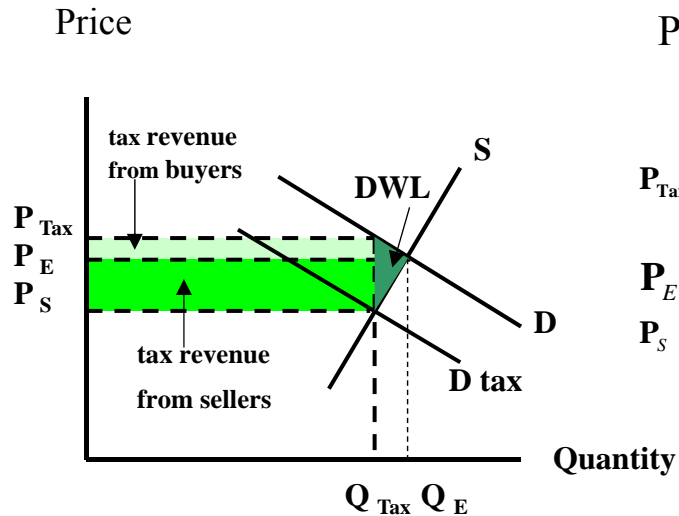
R13 Price Elasticity of Demand is Different Along a linear Demand Curve

- The relation between price elasticity of demand and total revenue.
 - Total revenue is maximized at the price and quantity where demand is unit elastic (price elasticity = - 1) and so decreases with both price increases or price decreases from that level.
 - When price is in the elastic (inelastic) region of the demand curve, a price increase will decrease (increase) total revenue.
- Note:
 - When $E_p > 1$, if price increases, the quantity will decrease, and the change in quantity is greater than that in price. As a result, the total revenue will decrease.
 - $TR = P \cdot Q$, $\Delta R/R = \Delta P/P + \Delta Q/Q$
 - $\Delta P \uparrow$, $\Delta Q \downarrow$, but $|\Delta Q| > |\Delta P|$
 - So $\Delta R/R = \Delta P/P + \Delta Q/Q < 0$.
 - TR decreases.

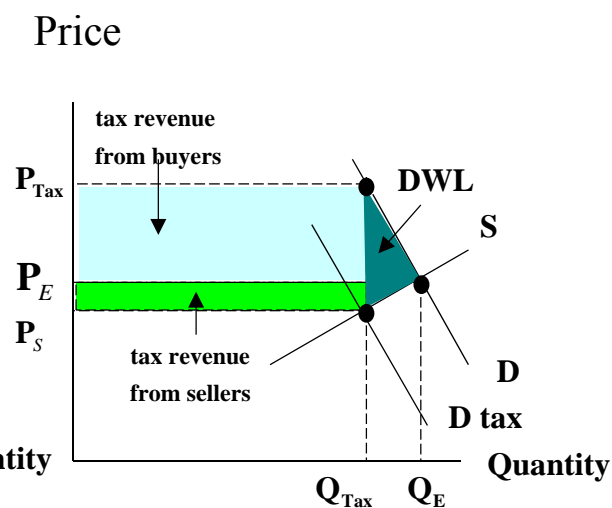


R13 Elasticity of Supply and Demand and Tax Incidence

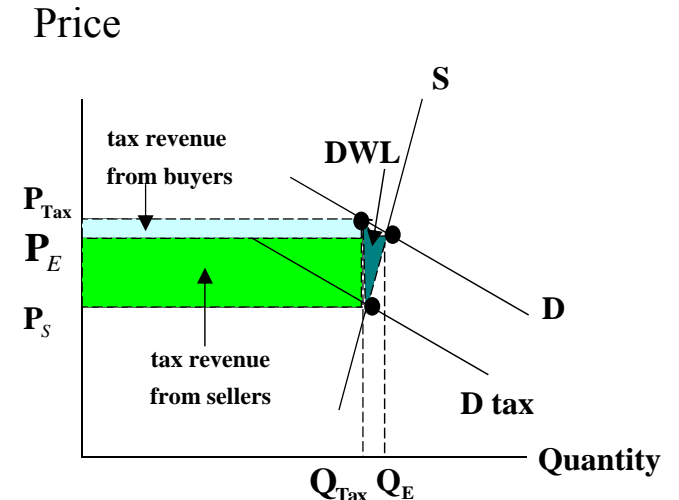
(a) Inelastic Supply Curve



(b) Inelastic Demand Curve



(c) Inelastic Supply and Demand Curve



- If the supply curve is less elastic, sellers will bear a higher tax burden. (Figure a)
- If the demand curve is less elastic, buyers will bear a higher tax burden. (Figure b)
- If elasticity of either demand or supply decreases, the deadweight loss will decrease. (compare Figure a with Figure c)

R13 Factors that Influence the Elasticity of Demand

- **Availability of substitutes**. If good substitutes are available, a price increase in one product will induce consumers to switch to a substitute good.
- **Relative amount of income spent on the good**. When the portion of consumer budgets spent on a particular good is relatively small, demand for that good will tend to be relatively inelastic.
- **Time since the price change**. The price elasticity of demand for most products is greater in the long run than in the short run.

R13 Cross Elasticity

➤ **Cross elasticity of demand** measures the change in the demand for a good in response to the change in price of a substitute or complementary good.

- The formula for calculating cross elasticity of demand is:

$$\text{cross elasticity of demand} = \frac{\text{percent change in quantity demanded}}{\text{percent change in price of substitute or complement}} = \frac{\Delta Q_A / Q_A}{\Delta P_B / P_B}$$

- Cross elasticity of demand is *positive* for substitute goods. (Example: apple and pear)
- Cross elasticity of demand is *negative* for complement goods. (Example: car and gas)

R13 Income Elasticity of Demand

- **Income elasticity of demand** measures the sensitivity of the quantity of a good or service demanded to a change in a consumer's income.

- The formula for income elasticity of demand is:

$$\text{income elasticity of demand} = \frac{\text{percent change in quantity demanded}}{\text{percent change in income}} = \frac{\Delta Q / Q}{\Delta I / I}$$

- **The application of Income elasticity**

- **Normal Goods**: positive income elasticity, demand rises with income. (> 0)
 - ✓ **Luxuries**: high positive elasticity, demand rises strongly with income. (> 1)
 - ✓ **Necessities**: normal but low elasticity (between $0 \sim 1$)
- **Inferior Goods**: negative income elasticity, demand falls with income (< 0)

R13 Example: Calculating Elasticity

➤ Example:

- $Q_x^d = 8,400 - 400P_x + 60I - 10P_y$
- choose \$3 for P_x
- \$50 (thousands) for I
- \$20 (thousands) for P_y

$$E_{P_x}^d = \frac{\Delta Q_x^d}{\Delta P_x} \times \frac{P_x}{Q_x^d} = -400 \times \frac{3}{10000} = -0.12 \rightarrow \text{own - price elasticity of demand}$$

$$E_I^d = \frac{\Delta Q_x^d}{\Delta I} \times \frac{I}{Q_x^d} = 60 \times \frac{50}{10000} = 0.3 \rightarrow \text{income elasticity of demand}$$

$$E_{P_y}^d = \frac{\Delta Q_x^d}{\Delta P_y} \times \frac{P_y}{Q_x^d} = -10 \times \frac{20}{10000} = -0.02 \rightarrow \text{cross - price elasticity}$$

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R14 Consumer Choice Theory and Utility Theory

- Framework
- Utility theory
- Budget constraint
- Substitution and income effects
- Normal goods and inferior goods

R14 Consumer Choice Theory and Utility Theory

➤ Framework: consumer choice theory

Utility theory	Budget constraints
Like to do	Can do
Consumer equilibrium	
Should do	
Demand curve	

R14 Consumer Choice Theory

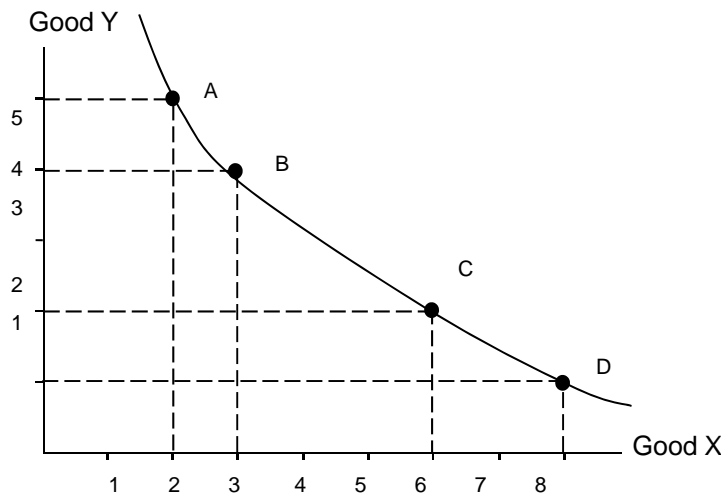
- **Consumer choice theory**: relates consumers' wants and preferences to the goods and services they actually buy.
 - It models what the consumer would like to consume.
 - It examines what the consumer can consume with limited income.
 - By superimposing what the consumer would like to do onto what the consumer can do, we arrive at a model of what the consumer would do under various circumstances.
 - Assumption: the consumer knows his or her own tastes and preferences and tends to take rational bundle.
- **Axioms of the theory of consumer choice**
 - **Complete preferences**: $A > B$ or $A < B$ or $A = B$
 - **Transitive preferences**: $A > B$ and $B > C \implies A > C$
 - **Non-satiation**: “more is better”, $A+1 > A$

R14 Utility Theory

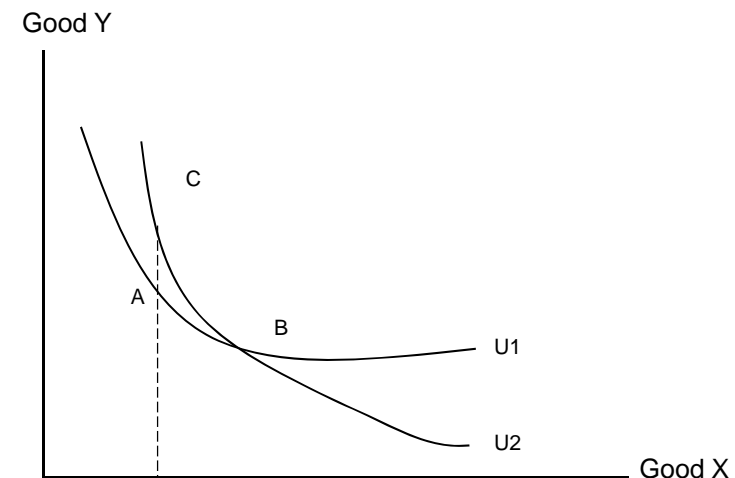
- Utility theory explains consumer behavior based on preferences for various alternative combinations of goods, in terms of the relative level of satisfaction they provide.
- Utility function: $utility = U(Q_A, Q_B, \dots, Q_N)$, where the variables are quantities consumed of goods A through N.
- Utility is an ordinal measure, rather than a cardinal measure.
 - Ordinal rankings are weaker measures than cardinal rankings because they do not allow the calculation and ranking of the differences between bundles.

R14 Indifference Curve

- Indifference curve represents all the combinations of two goods such that the consumer is entirely indifferent among them.
- Characteristics of indifference curve:
 - Indifference curves for two goods slope downward
 - Indifference curves are convex towards the origin
 - Indifference curves cannot cross



Indifference curves slope downward



Indifference curves cannot cross

R14 Marginal Rate of Substitution (MRS)

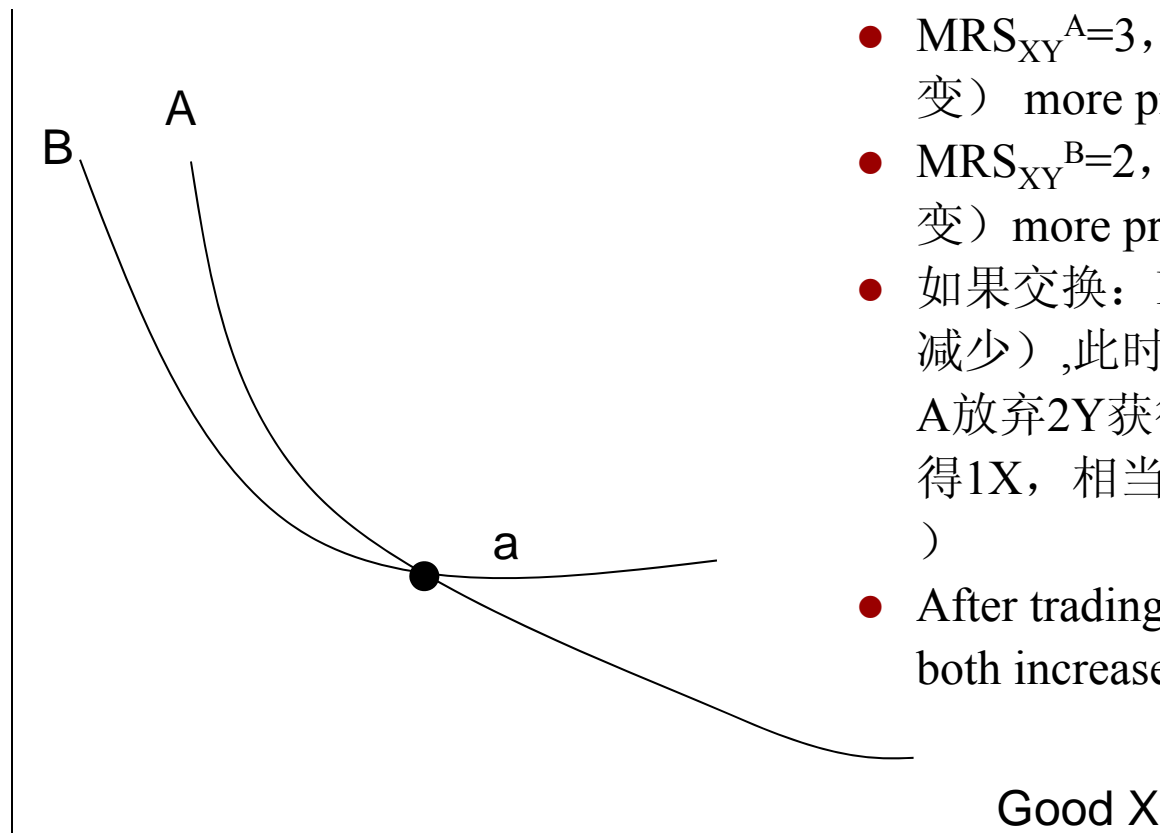
➤ Marginal rate of substitution (MRS)

- the rate at which the consumer is willing to give up one goods to obtain another goods, holding utility constant.
- $MRS_{XY} = - \Delta Y / \Delta X$
 - ✓ Example: $MRS_{XY} = 3$, increase 1 unit of Good X, have to give up 3 units of Good Y, holding utility constant.

➤ the law of diminishing marginal rate of substitution: as one moves down a (standardly convex) indifference curve, the marginal rate of substitution decreases (as measured by the absolute value of the slope of the indifference curve, which decreases).

R14 Voluntary Exchange

Good Y



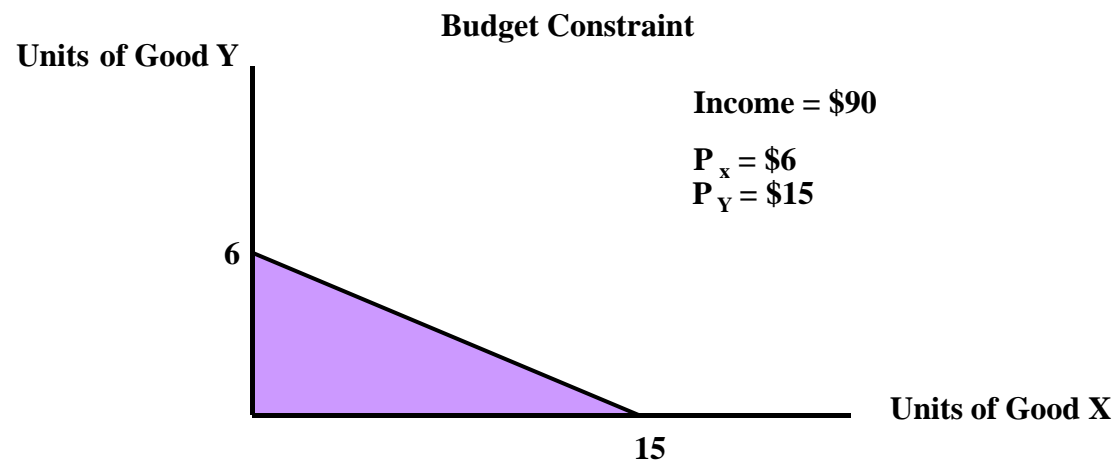
- If two consumers (A and B) have different MRS, they can both benefit from voluntary trade until $MRS_{XY}^A = MRS_{XY}^B$
- Example: at point a,
 - $MRS_{XY}^A = 3$, 则+1X 替代-3Y (效用不变) more preference for X
 - $MRS_{XY}^B = 2$, 则+1X 替代-2Y (效用不变) more preference for Y
 - 如果交换: B愿意以2Y (增加) 换1X (减少), 此时B的效用不变; 如果达成, A放弃2Y获得1X, 而A的效用提高 (交换得1X, 相当于获得3Y, 但是只放弃了2Y)
 - After trading, the utility of X and Y will both increase.

R14 Example: Voluntary Exchange

- Helen Smith and Tom Warren have identical baskets containing books (B) and compact discs (D). Smith's MRS_{BD} equals 0.8 (i.e., she is willing to give up 0.8 disc for 1 book), and Warren's MRS_{BD} equals 1.25.
- Determine whether Warren would trade.
 - **Solution to 1:**
 - ✓ Warren's MRS_{BD} equals 1.25, meaning that he is willing to give up 1.25 discs for 1 more book. Another way to say this is that Warren requires at least 1.25 discs to compensate him for giving up 1 book.
 - ✓ For Smith, MRS_{BD} is only 0.8, meaning that she would be willing to give up, at most 0.8 disc for a book.
 - ✓ Therefore, Warren's obtain B by giving up D with trading with Smith who will obtain D by giving up B.
- State and justify whether Smith or Warren has a relatively stronger preference for books.
 - **Solution to 2:** For Smith, $1B=0.8D$; For Warren, $1B=1.25D$, so Warren has a relatively stronger preference for Book.
- Determine whether Smith or Warren would end up with more discs than he or she had to begin with, assuming they were allowed to exchange at the rate of 1 book for 1 disc. Justify your answer.
 - **Solution to 3:** Smith would have more discs than she originally had. Because Smith has a relatively stronger preference for discs and Warren has a relatively stronger preference for books, Smith would trade books for discs and so would end up with more discs.

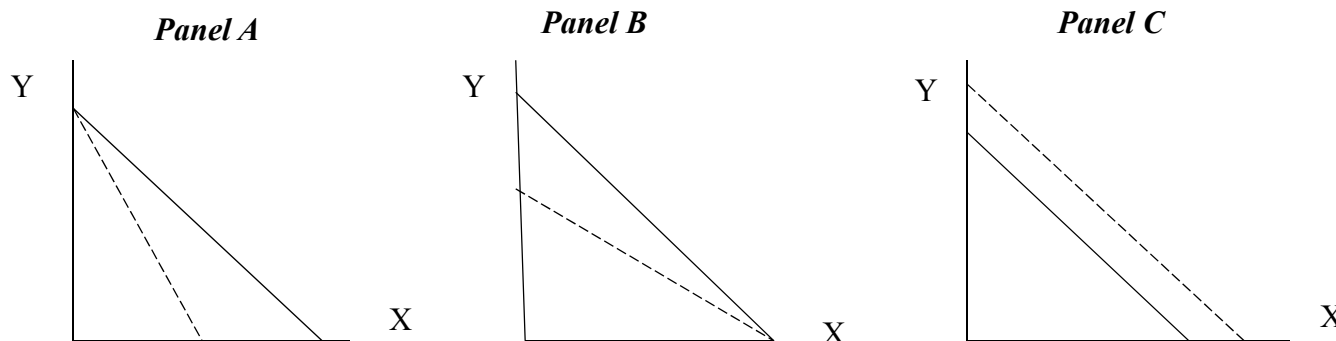
R14 Budget Constraints

- **Budget constraint** can be constructed based on the consumer's income and the prices of the available goods.
- The **budget line** shows all combinations of Good X and Good Y that will just exhaust the consumer's income.
 - $P_X * Q_X + P_Y * Q_Y \leq I$
 - Slope of Budget constraint is negative
 - Slope of Budget constraint is the **price ratio**



R14 Budget Constraints

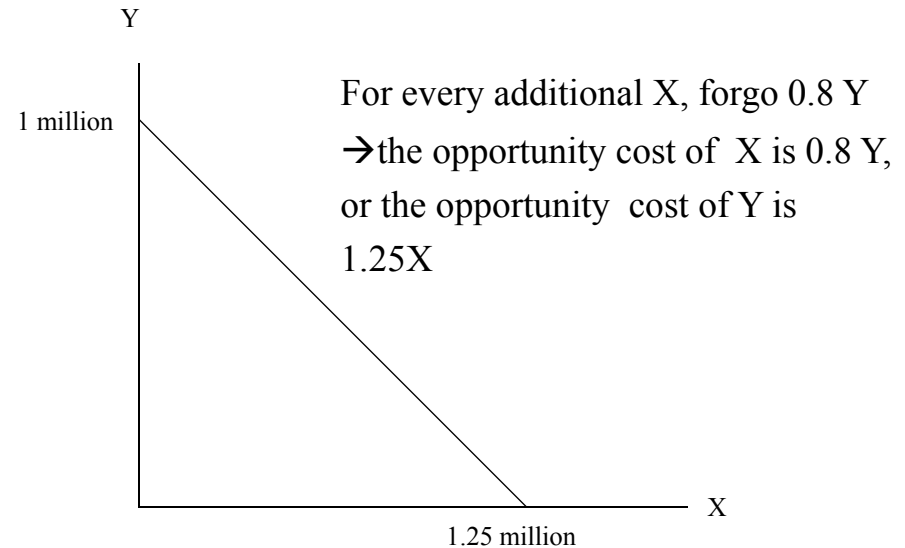
- Changing prices:
 - The price of Good Y keeps constant: an increase in the price of Good X pivots the budget constraint inward, becoming steeper.
 - The price of Good X keeps constant: an increase in the price of Good Y pivots the budget constraint downward, becoming less steep.
- Changing income: an increase in income shifts the budget constraint outward, parallel to the original constraint.



R14 Production Opportunity Frontier and Investment Opportunity Frontier

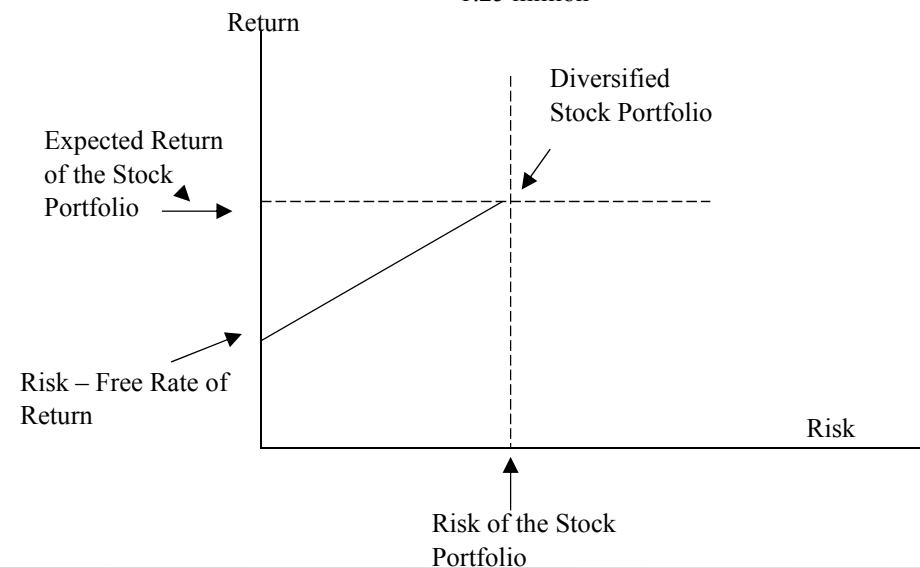
➤ Production opportunity frontier

shows the maximum number of units of one good it can produce, for any given number of the other good that it chooses to manufacture.



➤ Investment opportunity frontier

shows that as the investor chooses to invest a greater proportion of assets in the market portfolio, she can expect a higher return but also higher risk



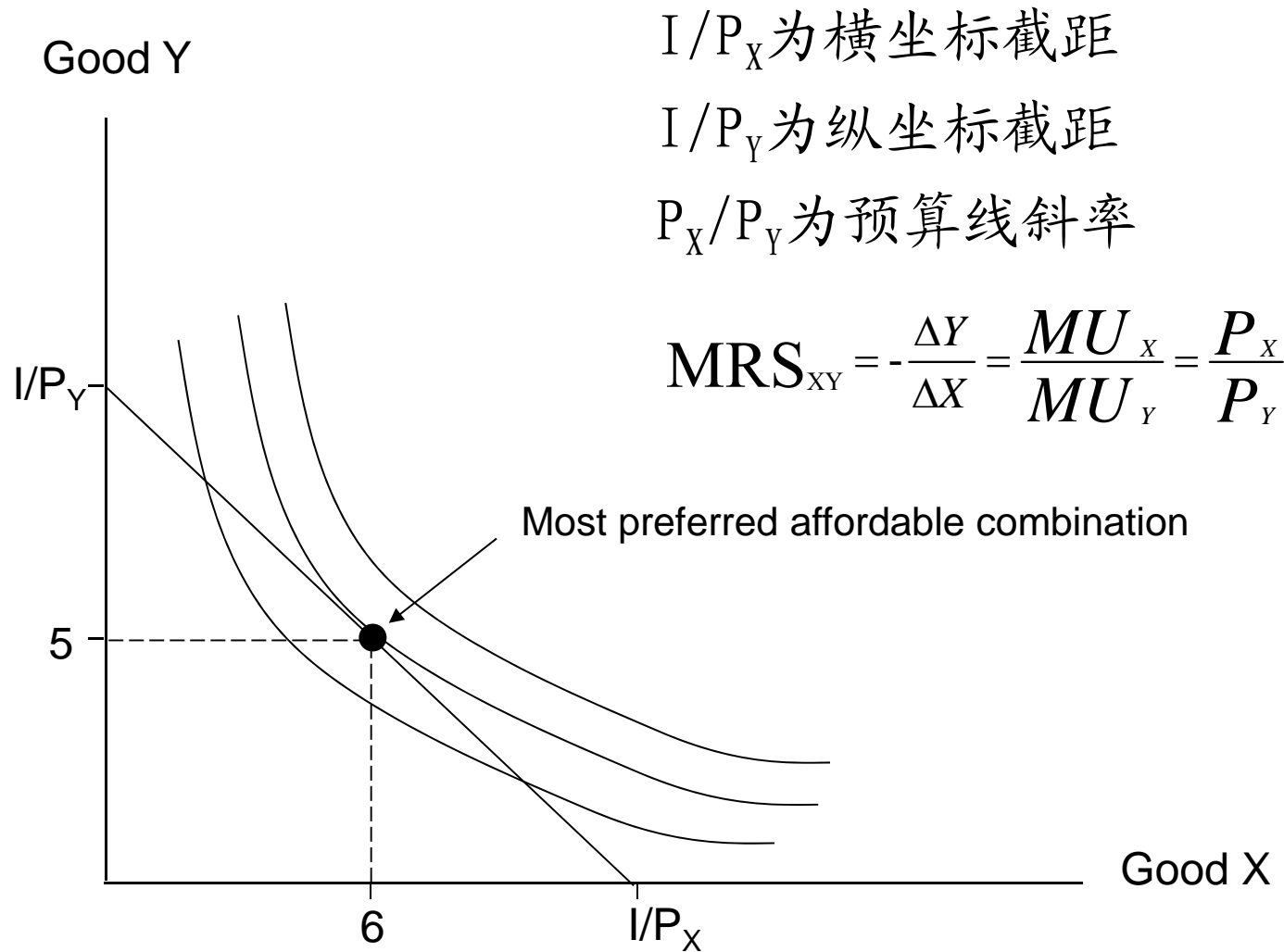
R14 Consumer's Equilibrium

➤ Consumer equilibrium

- Utility is maximized, subject to the budget constraint
- Tangency between budget constraint & the highest attainable indifference curve
- At tangent point, MRS_{XY} (边际替代率, 消费者意愿) = Price ratio (相对价格, 市场意愿)

$$MRS_{XY} = -\frac{\Delta Y}{\Delta X} = \frac{MU_X}{MU_Y} = \frac{P_X}{P_Y}$$

R14 Consumer's Equilibrium

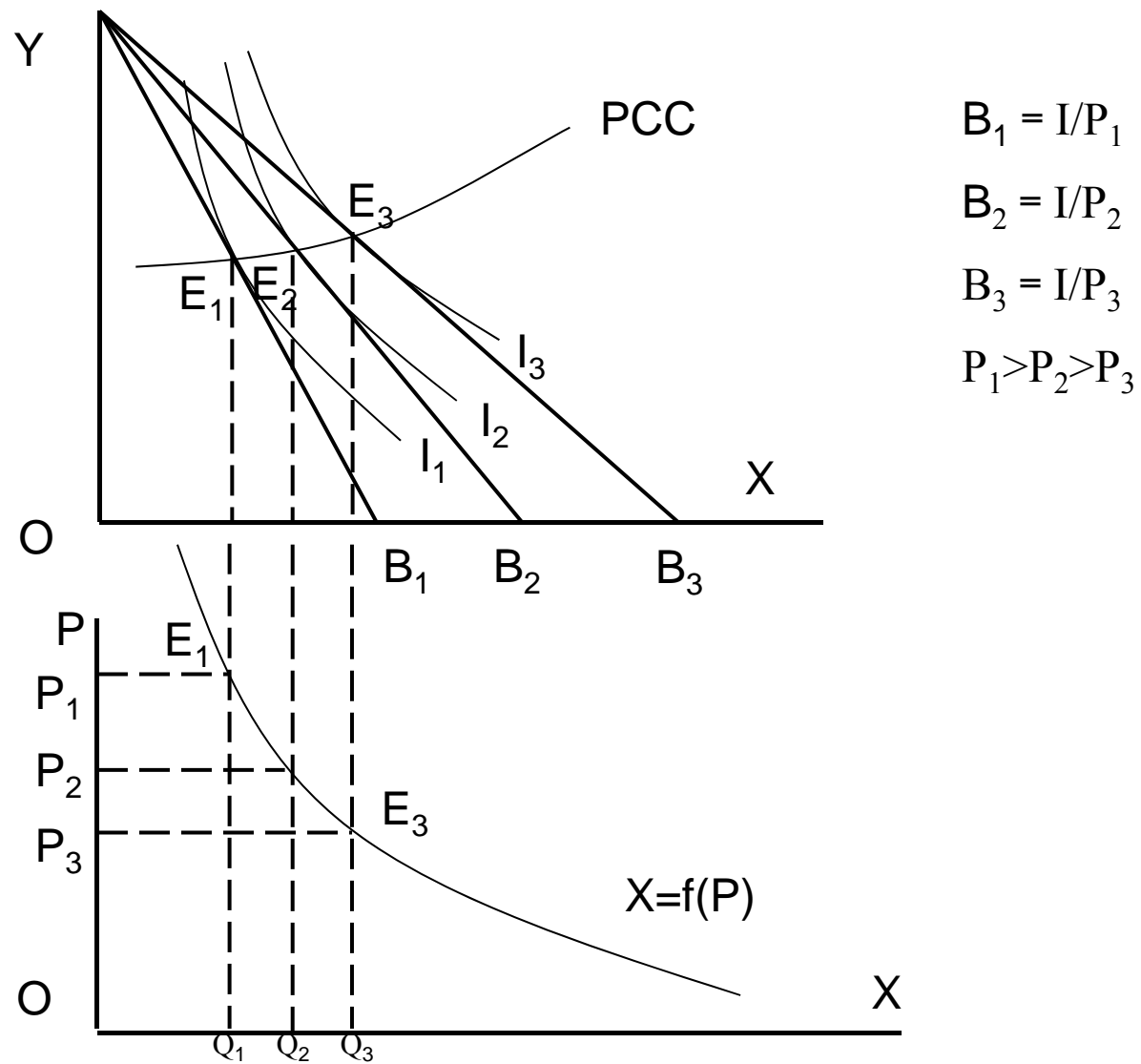


R14 Deriving a Demand Curve

Deriving a demand curve

- Assumption: consumer's preference, income, the quantity and price of the other good, Y, keep constant.
 - 不同价格水平下，预算线与无差异曲线相切时的点的轨迹
 - Get the price-consumption curve
 - Price-consumption curve (PCC) is used to indicate the effect of the change in a good's price on consumer's equilibrium.
- Based on the consumer's price-consumption curve, derive the consumer's demand curve.
 - According to the price-consumption curve, determine the quantity of Good X under different price level.
 - Use the horizontal axis to represent the quantity of Good X, vertical axis to represent the price of good, and take the shape of demand curve for Good X.

R14 Consumer's Equilibrium



R14 Substitution and Income Effects

➤ Substitution effect

- When the price of Good X decreases, the relative price of Good X against other goods will decrease. Consumer equilibrium moves along the indifference curve, which leads to an increase in the demand of Good X.

➤ Income effect

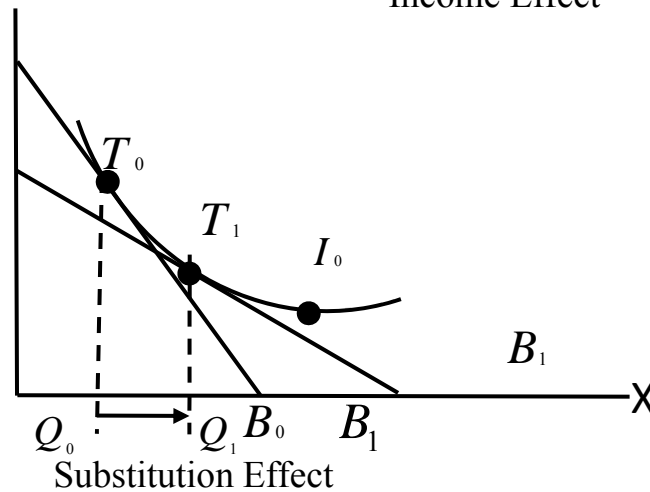
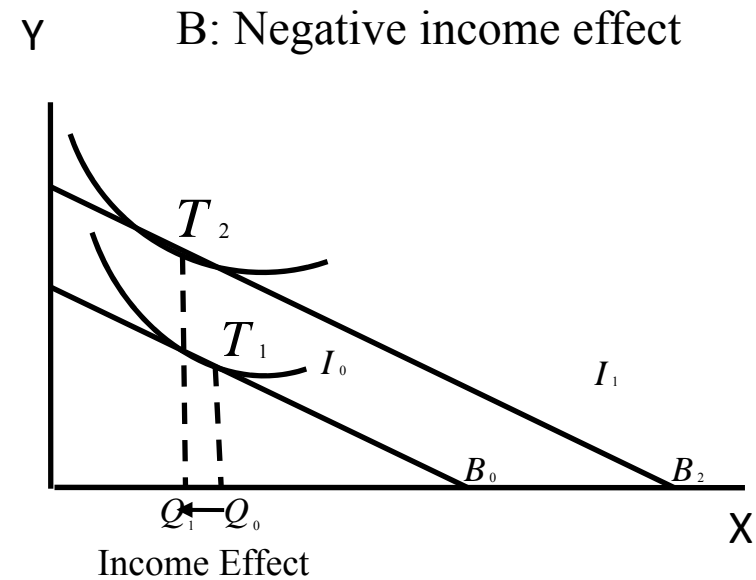
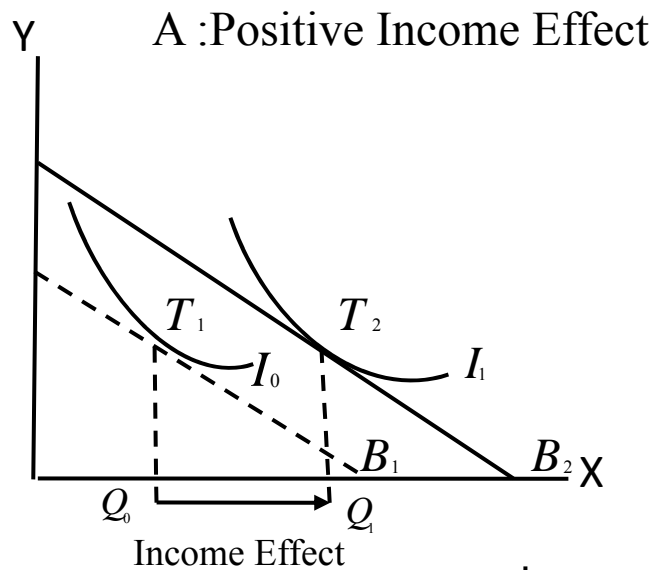
- When the price of Good X decreases, consumer's real purchasing power will change. Real income increases, and budget constraint moves, which lead to a change in the demand of Good X.

➤ Income effect & Substitution effect共同作用决定需求量变化

➤ When decrease in the price of Good X:

- The substitution effect is positive, and the income effect is also positive—consumption of Good X will increase.
- The substitution effect is positive, and the income effect is negative but smaller than the substitution effect—consumption of Good X will increase.
- The substitution effect is positive, and the income effect is negative and larger than the substitution effect—consumption of Good X will decrease

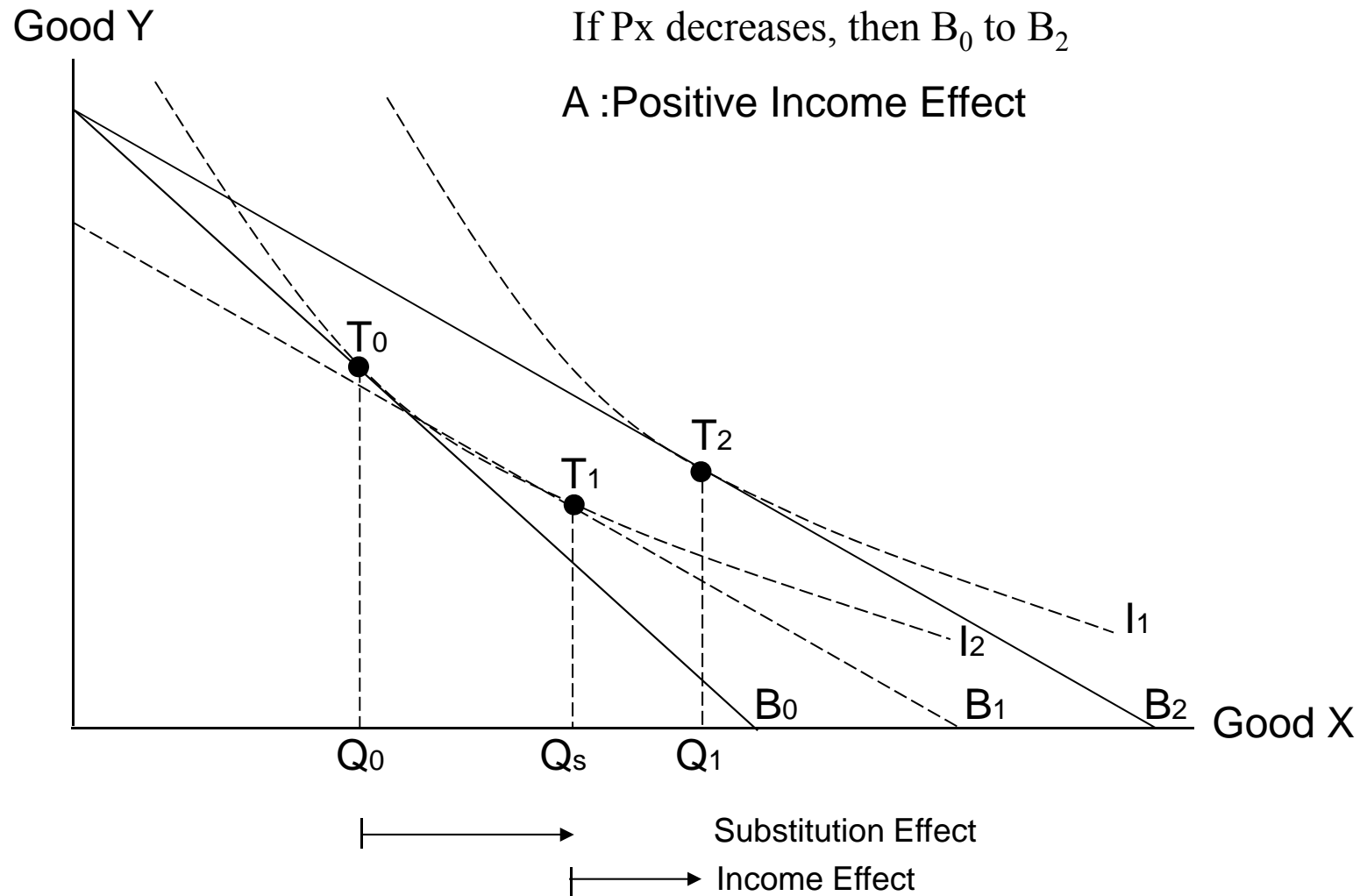
R14 Income Effect



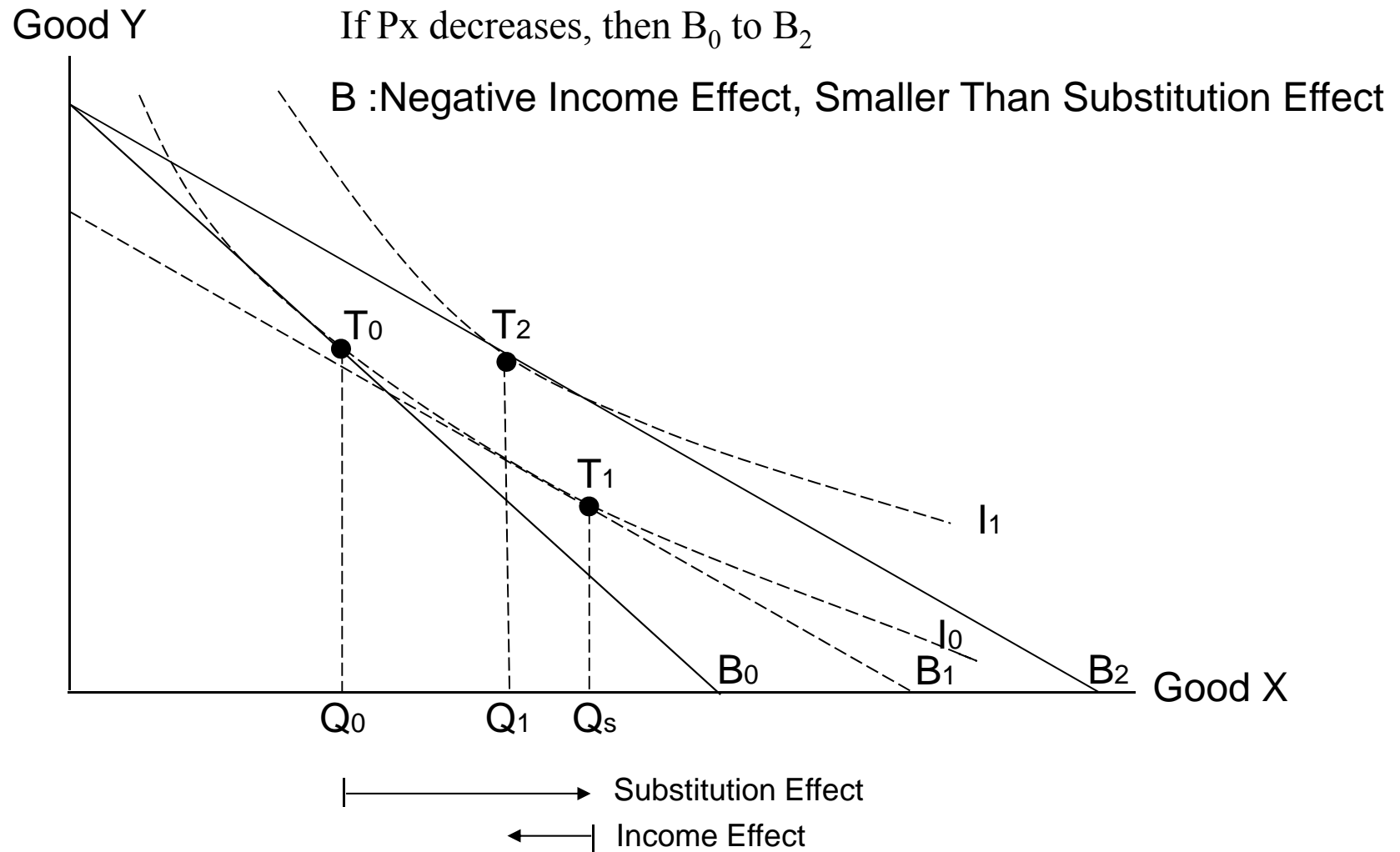
$$B_0 = I/P_{X1} \quad B_1 = I/P_{X2}$$

$$P_{X1} > P_{X2} \quad B_1 > B_0$$

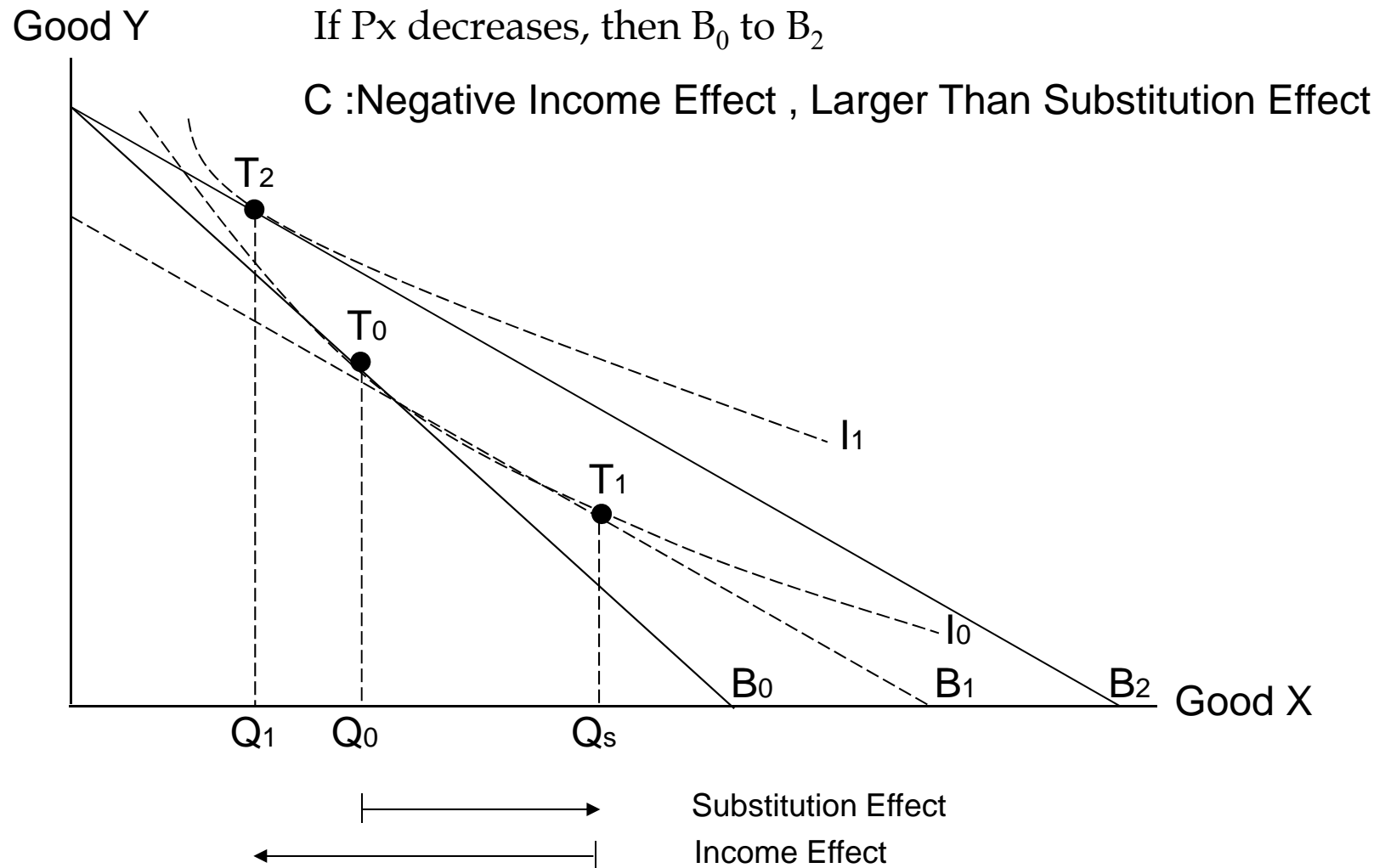
R14 Substitution and Income Effects



R14 Substitution and Income Effects



R14 Substitution and Income Effects



R14 Two-part Tariff Pricing

- *Two-part tariff* assesses one price per unit of the item purchased plus a per-month fee (sometimes called an "entry fee") equal to the buyer's consumer surplus evaluated at the per-unit price.

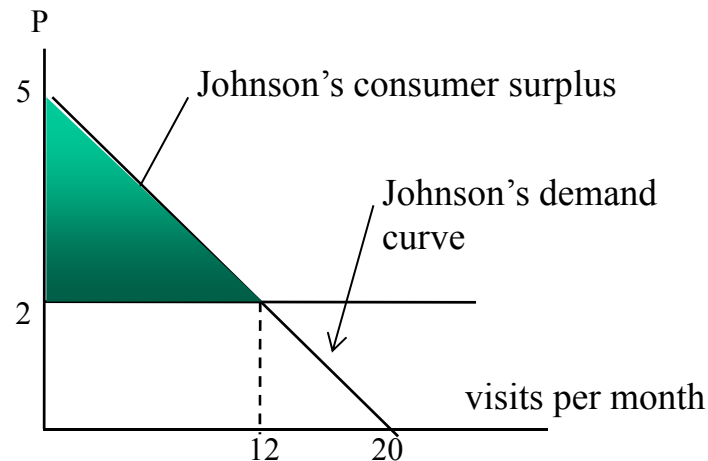
- Example:

Nicole Johnson's monthly demand for visits to her health club is given by the following equation: $Q^d = 20 - 4P$, where Q^d is visits per month and P is euros per visit. The health club's marginal cost is fixed at €2 per visit.

1. Determine Johnson's demand curve for health club visits per month.
2. Calculate how many visits Johnson would make per month if the club charged a price per visit equal to its marginal cost.
3. Calculate Johnson's consumer surplus at the price determined in Question 2
4. Calculate how much the club could charge Johnson each month for a membership fee.

R14 Example: Two-part Tariff Pricing

- ✓ **Solution to 1:** $Q^d = 20 - 4P$, so when $P = 0$, $Q^d = 20$. Inverting, $P = 5 - 0.25Q$, so when $Q = 0$, $P = 5$.



Two part tariff:
one price per unit (€2) plus a
per month fee (CS at the per
unit price)

- ✓ **Solution to 2:** $Q^d = 20 - 4 \times 2 = 12$. Johnson would make 12 visits per month at a price of €2 per visit.
- ✓ **Solution to 3:** Johnson's consumer surplus can be measured as the area under her demand curve and above the price she pays, for a total of 12 visits: $CS = (1/2) \times 12 \times 3 = 18$. Johnson would enjoy €18 per month consumer surplus.
- ✓ **Solution to 4:** The club could extract all of Johnson's consumer surplus by charging her a monthly membership fee of €18 plus a per-visit price of €2.

R14 Normal Goods and Inferior Goods

- Normal good is one for which the income effect is positive.
- Inferior good is one for which the income effect is negative.
- Giffen goods (吉芬商品):
 - Income effect (inferior goods) > Substitution effect
 - demand curve has positive slope
- Veblen goods (韦伯伦商品, Conspicuous goods):
 - Consumer can not truly value a good until the price is known.
 - Price is used by the consumer to signal the status in the society.
 - High price → high value → high demand quantity (extremely)
 - ✓ have a positively sloped demand curve (eg: Gucci bag) firstly
 - ✓ But when price increases, the slope may be negative.
- two important distinctions between Giffen goods and Veblen goods.
 - First, Giffen goods are inferior goods (negative income effect), while Veblen goods certainly are not.
 - Second, the existence of Giffen goods is theoretically supported by our rules of consumer choice, while the existence of Veblen goods is not.

R14 Normal Goods and Inferior Goods

Summary for substitution effect and income effect

Item	Relation between substitution effect and price	Relation between income effect and price	Relation between total effect and price	Shape of demand curve
Normal good	Negative	Negative	Negative	Downward
Inferior good	Negative	Positive	Negative	Downward
Giffen good	Negative	Positive	Positive	Upward

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R15 Demand and Supply: the Firm

- Accounting profit, economic profit, normal profit and economic rent
- Total, average, and marginal revenue
- Total, average, marginal, fixed, and variable costs
- Breakeven and shutdown points of production
- Economies of scale and diseconomies of scale
- Profit maximization
- Total, marginal, and average product of labor

R15 Accounting Profit, Economic Profit and Normal Profit

- Accounting profit may be referred to as net income, net profit, net earnings, or the “bottom line” (of the firm’s income statement).
 - Accounting profit = total revenue – total accounting (explicit) cost
- Economic profit is also referred to as abnormal profit. It is equal to accounting profit less implicit costs.
 - Implicit costs are the opportunity costs of resources supplied to the firm by its owners.
 - For private firms, these costs may include the opportunity cost of owner-supplied capital and the opportunity cost of the time and entrepreneurial ability of the firm’s owners.
 - For publicly traded firms, implicit costs are typically only the opportunity cost of equity owners’ investment in the firm.
 - Economic profit = accounting profit – implicit opportunity costs
 - Or economic profit = total revenue – total economic costs
- Normal profit is the accounting profit that makes economic profit zero.
 - Accounting profit = economic profit + normal profit

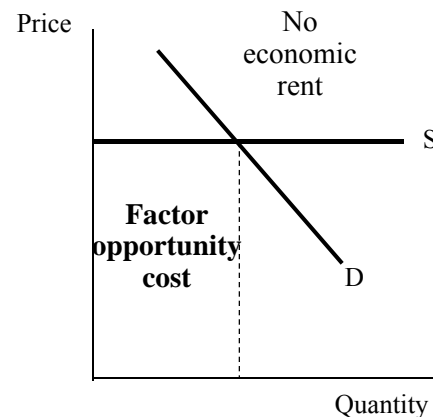
R15 Relationship of Accounting, Normal, and Economic Profit to Equity Value

Relationship between Accounting Profit and Normal Profit	Economic Profit	Firm's Market Value of Equity
Accounting profit > Normal profit	Economic profit > 0 and firm is able to protect economic profit over the long run	Positive effect
Accounting profit = Normal profit	Economic profit = 0	No effect
Accounting profit < Normal profit	Economic profit < 0 implies economic loss	Negative effect

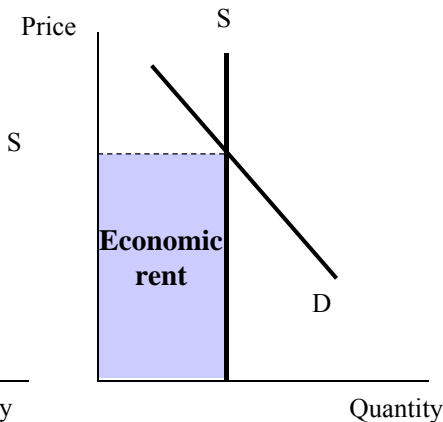
R15 Economic Rent

- **Economic rent** is used to describe a payment to a factor of production above its value in its next highest-valued use (its opportunity cost).
- If we think of a supply curve as the marginal opportunity cost of an input, a perfectly inelastic supply curve would indicate that any payment to the factor is greater than its opportunity cost and would be economic rent.
 - In the case of a perfectly elastic supply curve for a factor, there is no economic rent.

(a) Perfectly elastic supply



(b) Perfectly inelastic supply



R15 Comparing Measures of Profit

- In the short run, the normal profit for a firm may be considered fixed. In the long run, it will vary with the required rate of return on equity investments.
- Accounting profit is often highly variable in both the long run and the short run.
- Economic profit is highly variable in both the short run and long run.
- Normal profit is minimum requirement for a firm to continue operating in the long run.
- A firm unable to earn a normal profit (a firm with negative economic profit) will find it more difficult to raise equity capital, and the value of its equity in the market is likely to decline.
- Earning a positive economic profit will increase the value of a firm's equity, and negative economic profit will decrease the value of a firm's equity

R15 Analysis of Revenue and Cost

(Economic) profit	Total revenue minus total economic cost; ($TR - TC$)
Total revenue (TR)	Price times quantity ($P * Q$), or the sum of individual units sold times their respective prices; $\sum P_i * Q_i$
Average revenue (AR)	Total revenue divided by quantity; (TR / Q)
Marginal revenue (MR)	Change in total revenue divided by change in quantity; ($\Delta TR / \Delta Q$)
Costs	
Total fixed cost (TFC)	Sum of all fixed expenses; here defined to include all opportunity costs
Total variable cost (TVC)	Sum of all variable expenses, or per unit variable cost times quantity; (per unit VC * Q)
Total costs (TC)	Total fixed cost plus total variable cost; ($TFC + TVC$)
Average fixed cost (AFC)	Total fixed cost divided by quantity; (TFC/Q)
Average variable cost (AVC)	Total variable cost divided by 'quantity; (TVC / Q)
Average total cost (ATC)	Total cost divided by quantity; (TC/Q) or ($AFC + AVC$)
Marginal cost (MC)	Change in total cost divided by change in quantity; ($\Delta TC / \Delta Q$)

R15 Total Revenue, Average Revenue, and Marginal Revenue

- *Total revenue (TR)* for any firm that charges a single price to all customers is calculated as price multiplied by quantity sold, or

$$TR = \sum P * Q.$$

- *Average revenue (AR)* is equal to total revenue divided by the quantity sold, $AR = TR/Q$.

- *Marginal revenue (MR)* is the increase in total revenue from selling one more unit of a good or service. $MR = P \times (1 - \frac{1}{\epsilon_p})$

R15 Total Revenue, Average Revenue, and Marginal Revenue

➤ Under imperfect competition

- Firms face downward-sloping demand curve, price searchers.
- Average revenue (AR) and marginal revenue (MR) will decline as quantity of goods sold increase.
- AR is not equal to MR for any quantities greater than zero.
- The decrease in MR is more than the decrease in price or AR.
- Total revenue (TR) is maximized when $MR=0$.

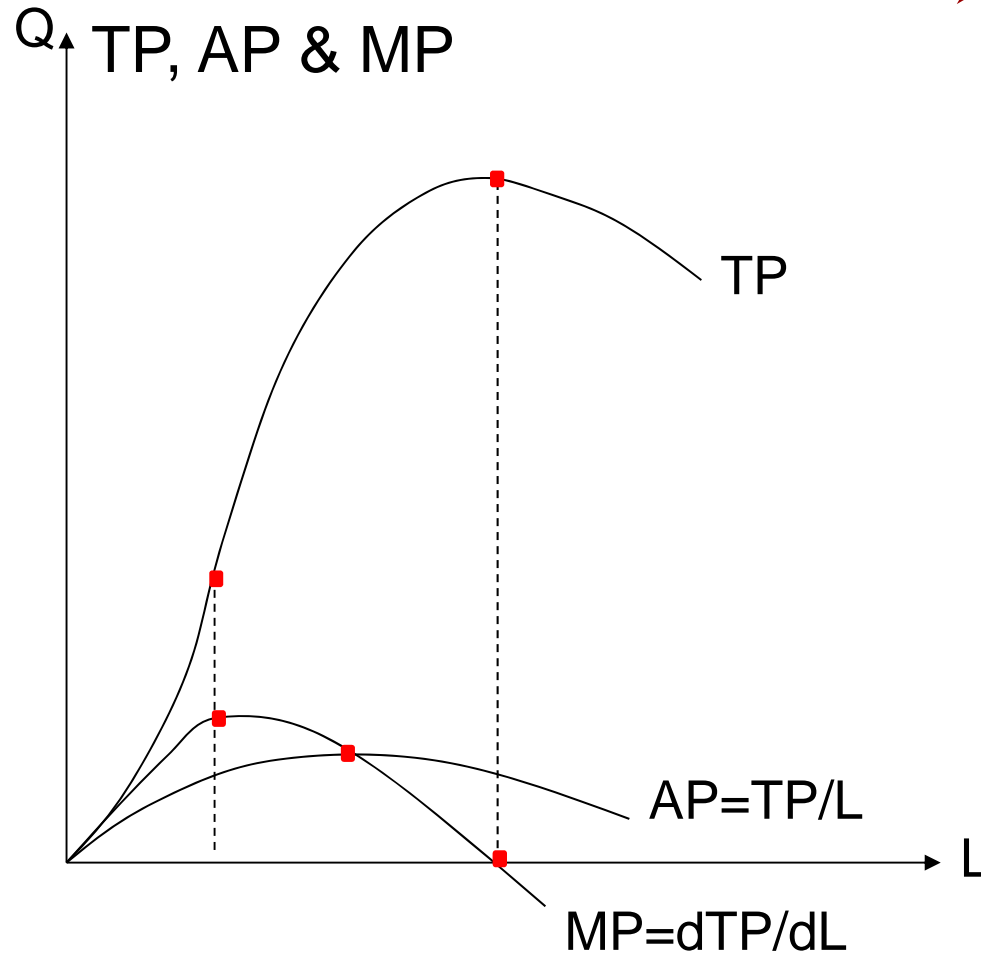
➤ Under perfect competition

- The individual firm has virtually no impact on market price, price taker.
- The individual seller faces a horizontal demand curve over relevant output ranges at the price level established by the market.

R15 Factors of Production

- **Factors of production**, the inputs to the production of goods and services, include:
 - **Land**, as in the site location of the business;
 - **Labor**, which consists of the inputs of skilled and unskilled workers as well as the inputs of firms' managers;
 - **Capital**, which in this context refers to physical capital – such tangible goods as equipment, tools, and buildings. Capital goods are distinguished as inputs to production that are themselves produced goods;
 - **Materials**, which in this context refers to any goods the business buys as inputs to its production process.
- For economic analysis, we often consider only two inputs, capital and labor.
- **Production function**: the quantity of output that a firm can produce can be thought of as a function of the amounts of capital and labor employed and represented as $Q=f(K,L)$.

R15 Law of Diminishing Returns



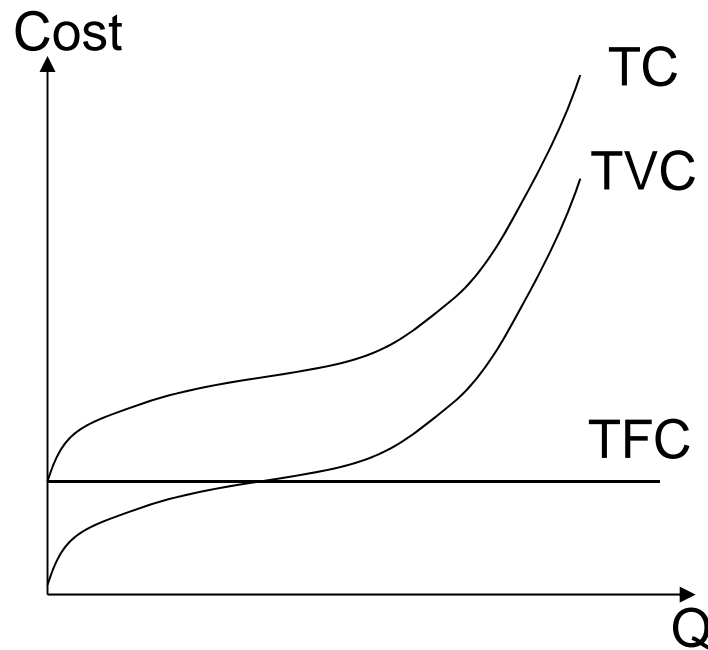
- The law of diminishing returns states that as more and more resources (such as labor) are devoted to a production process, they increase output but at an ever decreasing rate.

R15 Total, Average, Marginal, Fixed, and Variable costs

- **Total fixed cost (TFC)** is the cost of inputs that do not vary with the quantity of output and cannot be avoided over the period of analysis.
- **Total variable cost (TVC)** is the cost of all inputs that vary with output over the period of analysis.
- **Total cost (TC)** is the sum of all costs (fixed or variable, explicit and implicit) of producing a specific level of output.
 - Total cost = total fixed cost + total variable cost
 - Marginal cost = change in total cost / change in output
 - Average fixed cost = total fixed cost / output
 - Average variable cost = total variable cost / output
 - Average cost = total cost / output = AFC+AVC

R15 Total, Average, Marginal, Fixed, and Variable costs

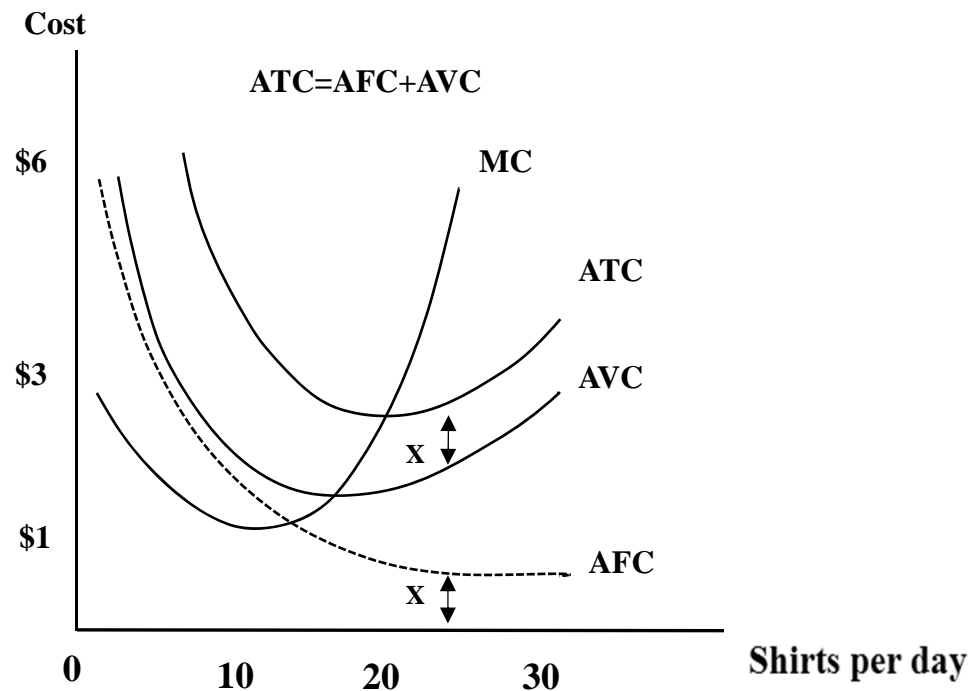
Short-run Costs



$TC \text{ (total cost)} = \text{total fixed cost} + \text{total variable cost}$

R15 Total, Average, Marginal, Fixed, and Variable Costs

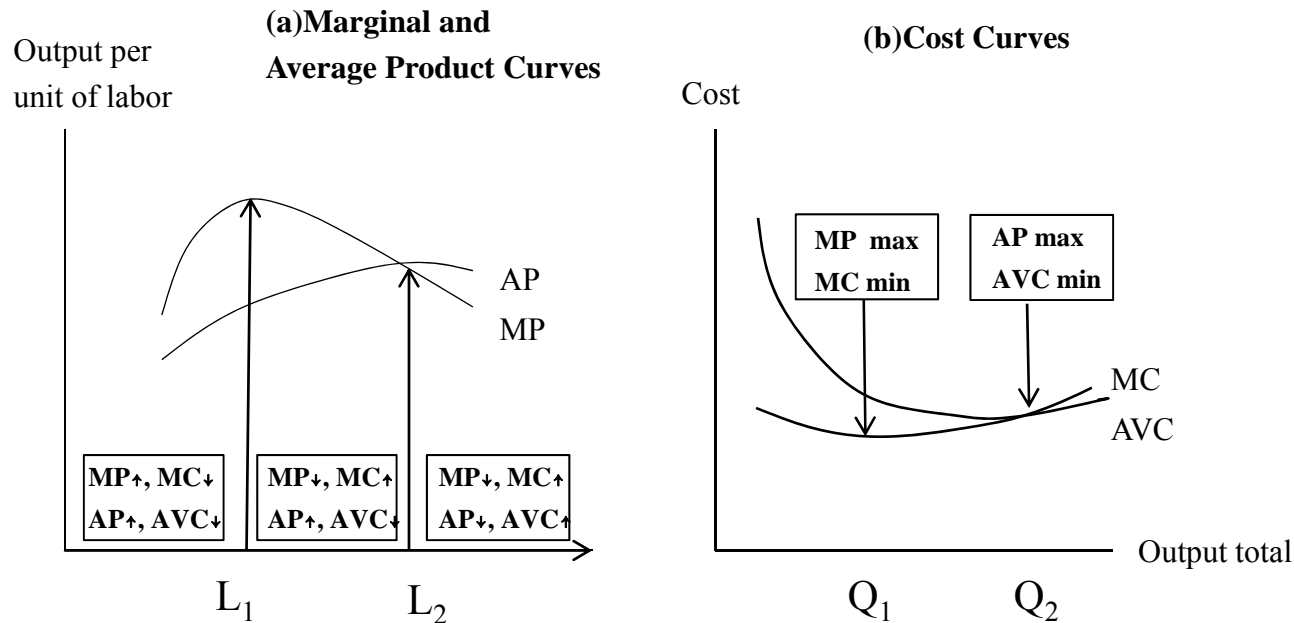
Average and Marginal Costs



- AFC slopes downward.
- The vertical distance between the ATC and AVC curves is equal to AFC.
- MC declines initially, then increases.
- MC intersects AVC and ATC at their minimum points.
- ATC and AVC are U-shaped.
- Minimum point on the ATC curve represents the lowest cost per unit, but it is not necessarily the profit-maximizing point.
- The MC curve above AVC is the firm's short-run supply curve in a perfectly competitive market.

R15 Total, Average, Marginal, Fixed, and Variable Costs

Product and Cost Curves



The law of diminishing returns states that as more and more resources (such as labor) are devoted to a production process, they increase output but at an ever decreasing rate.

- As labor and output increase, AP reaches a maximum at the same output for which AVC is at a minimum.
- As labor and output increase, the MP curve reaches a maximum at the output where the MC curve is at its minimum.

R15 Long Run and Short Run

➤ Long term & short term

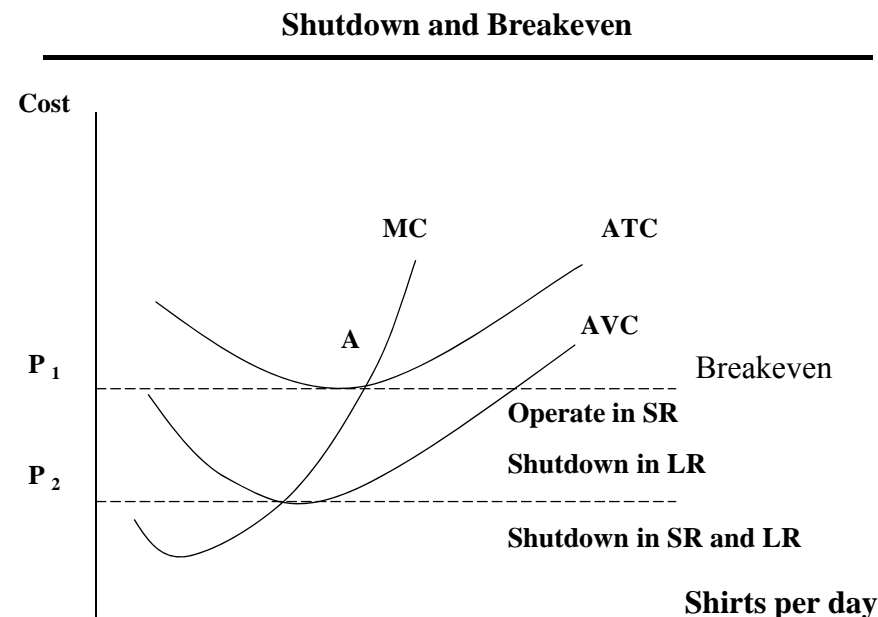
- The **short term/run** is defined as a time period for which quantities of some resources are fixed, such as **buildings, technology and equipment**.
- The technology of production is fixed in the short run and is a constraint on a firm's ability to increase production.
- Typically, economists treat labor and raw materials as variable in the short run, holding plant size, capital equipment, and technology constant. All of these factors become variable in the long run.

R15 Shutdown Point and Breakeven Point

- If $AR < AVC$ in the short run, the firm should shut down. This is its *short-run shutdown point*.
- If $AR > AVC$ in the short run, the firm should continue to operate, even if it has losses.
- In the long run the firm should shut down if $AR < ATC$. This is the *long-run shutdown point*.
- If $AR = ATC$, total revenue is just equal to total (economic) cost, and this is the firm's *breakeven point*.

R15 Shutdown and Breakeven under Perfect Competition

- If $AR \geq ATC$, firm should stay in the market in both the short and long run.
Notes: in another way, we can compare TR to TC
- If $AR \geq AVC$, but $AR < ATC$, the firm should stay in market in the short run but will exit the market in the long run
- If $AR < AVC$, the firm should shut down in the short run and exit the market in the long run. *Notes: in another way, we can compare TR to TVC*



R15 Conclusion for Perfect Competition

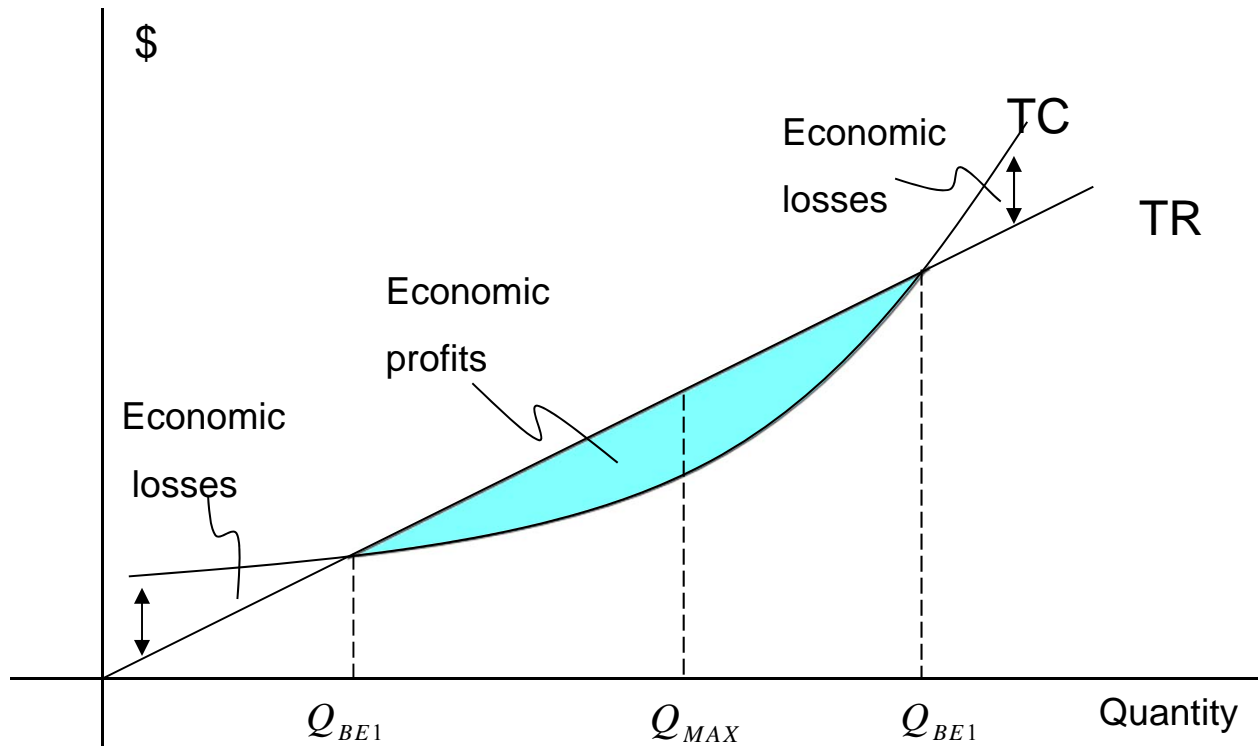
- Specifically, the conclusion for pure competition is as follows:
- If $P > ATC$, the firm can realize economic profit
 - If $ATC > P > AVC$, the firm will face a loss, but he can compensate some fixed cost more or less
 - If $P < AVC$, the firm can't compensate even variable cost, so he will leave this industry.
 - **Therefore, if the price is more than average variable cost, the firm will continue his operation.**

R15 Shutdown and Breakeven

- $TR = TC$: breakeven.
- $TC > TR > TVC$: firm should continue to operate in the short run but shutdown in the long run.
- $TR < TVC$: firm should shut down in the short run and the long run.
 - Because price does not equal average revenue (or marginal revenue) for a firm in imperfect competition, analysis based on total costs and revenues is better suited for examining breakeven and shutdown points.

Revenue-Cost Relationship	Short-Run Decision	Long-Run Decision
$TR \geq TC$	Stay in market	Stay in market
$TR > TVC$ but $TR < TFC + TVC$	Stay in market	Exit market
$TR < TVC$	Shut down production to zero	Exit market

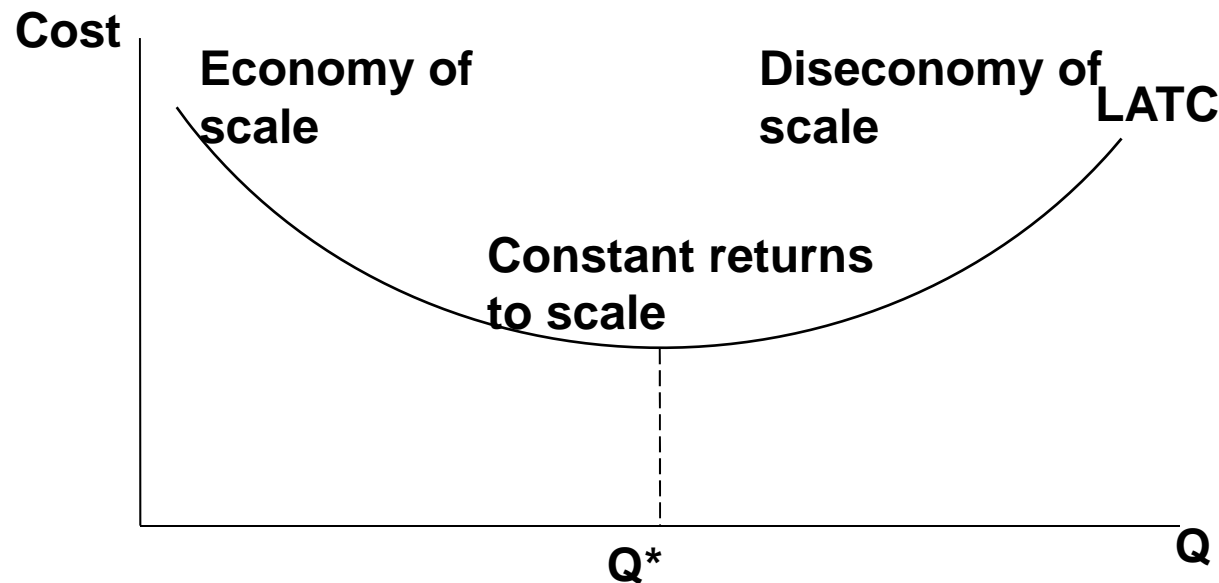
R15 Breakeven Point Using the Total Revenue/Total Cost Approach



- If the entire TC curve exceeds TR (i.e., no breakeven point), the firm will want to minimize the economic loss in the short run by operating at the quantity corresponding to the smallest (negative) value of $TR - TC$.

R15 Economies of Scale and Diseconomies of Scale

- The downward sloping segment of the long-run average total cost curve indicates the *economies of scale*.
- The upward sloping segment of this long-run average total cost curve indicates that *diseconomies of scale* are present when average unit costs rise as the scale of the business

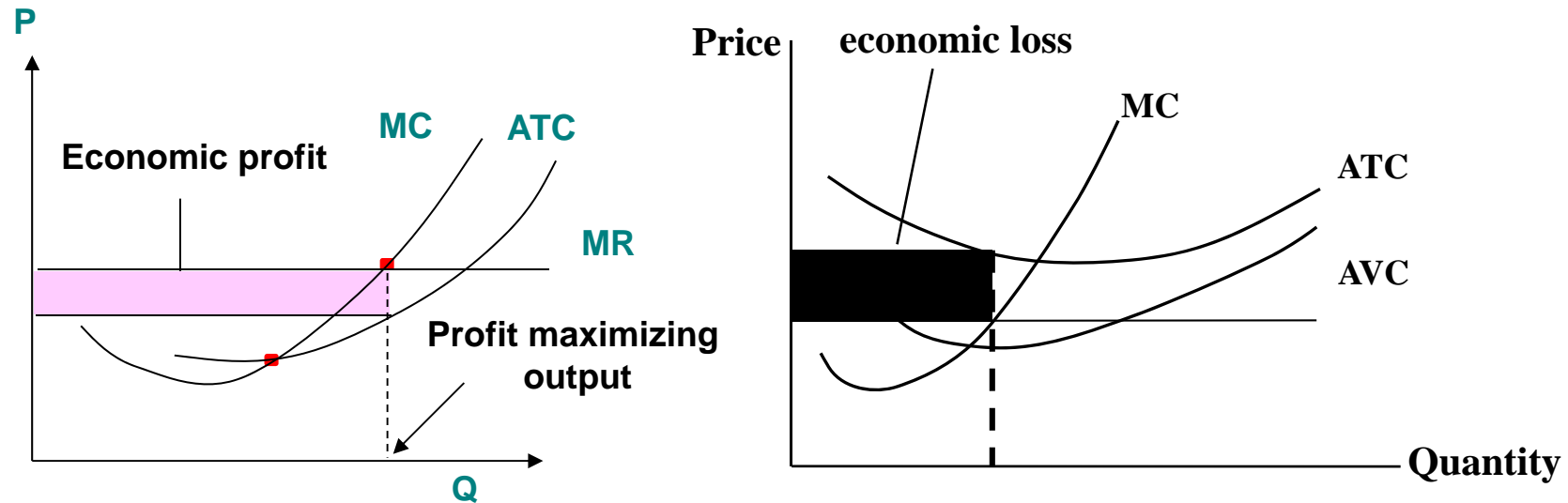


R15 Profit Maximization

- **Profit maximization occurs when**
 - The difference between total revenue (TR) and total costs (TC) is the greatest;
 - Marginal revenue (MR) equals marginal cost (MC);
 - The revenue value of the output from the last unit of input employed equals the cost of employing that input unit
- Summary of profit maximization and loss minimization under perfect competition

Revenue-Cost Relationship	Actions by Firm
$TR = TC$ and $MR > MC$	Firm is operating at lower breakeven point; increase Q to enter profit territory.
$TR \geq TC$ and $MR = MC$	Firm is at maximum profit level; no change in Q.
$TR < TC$ and $TR \geq TVC$ but $(TR - TVC) < TFC$ (covering TVC but not TFC)	Find level of Q that minimizes loss in the short run; work toward finding a profitable Q in the long run; exit market if losses continue in the long run.
$TR < TVC$ (not covering TVC in full)	Shut down in the short run; exit market in the long run.
$TR = TC$ and $MR < MC$	Firm is operating at upper breakeven point; decrease Q to enter profit territory.

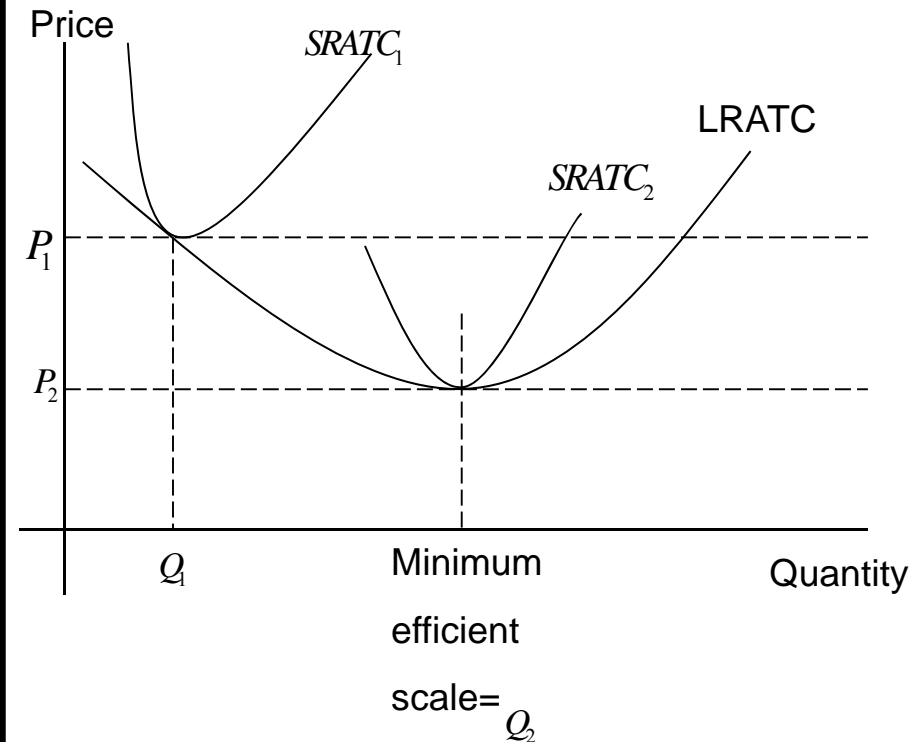
R15 Profit Maximizing Output under Perfect Competition



- **Economic profit** equals **total revenue less the opportunity cost of production**, which includes the cost of a normal return to all factors of production, including invested capital.
- In the short run, economic profit is maximized when **marginal revenue=marginal cost =price ($MR=MC=P$)**
- **Economic loss** occurs if $P < ATC$. The firm will be generating losses on its marginal production and will reduce output to where $MR=MC$

R15 Short-Run and Long-Run Profit Maximization

- In the short-run:
 - $MR = MC$, and $P > AVC$
- In the long-run:
 - Entry of firms into the industry or increases in firm size in response to positive economic profit put downward pressure on market price.
 - The exit of firms from the industry when economic profit is negative decreases industry supply, and the equilibrium market price increases.
 - The long-run industry supply curve is perfectly elastic at the ATC for the minimum efficient scale.
 - ✓ In practice, this result will hold only if the cost of the firms' inputs is constant as the industry expands output.



R15 Example: Profit Maximization and the Breakeven Point under Imperfect Competition

➤ Example:

The following exhibit shows revenue and cost data for a firm that operates under the market structure of imperfect competition.

1. At what point does the firm break even over its production range in the short run?
2. What is the quantity that maximizes profit given total revenue and total costs?
3. Comparing marginal revenue and marginal cost, determine the quantity that maximizes profit.

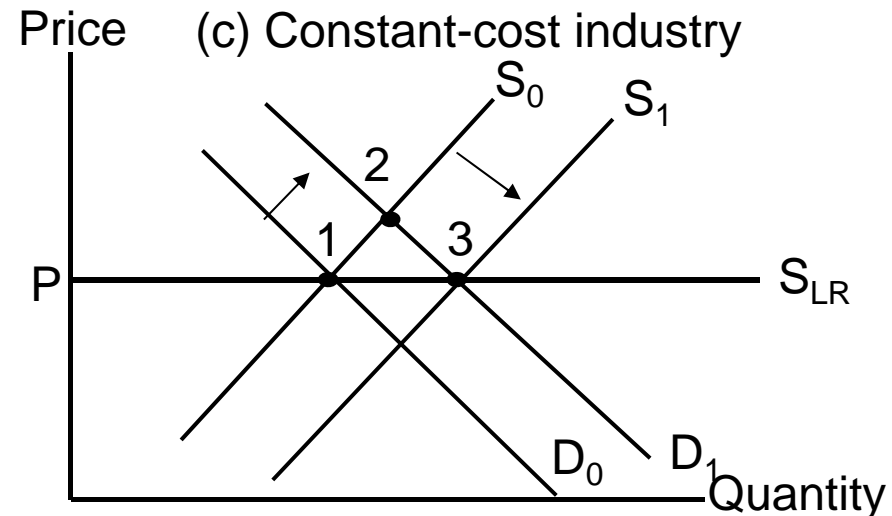
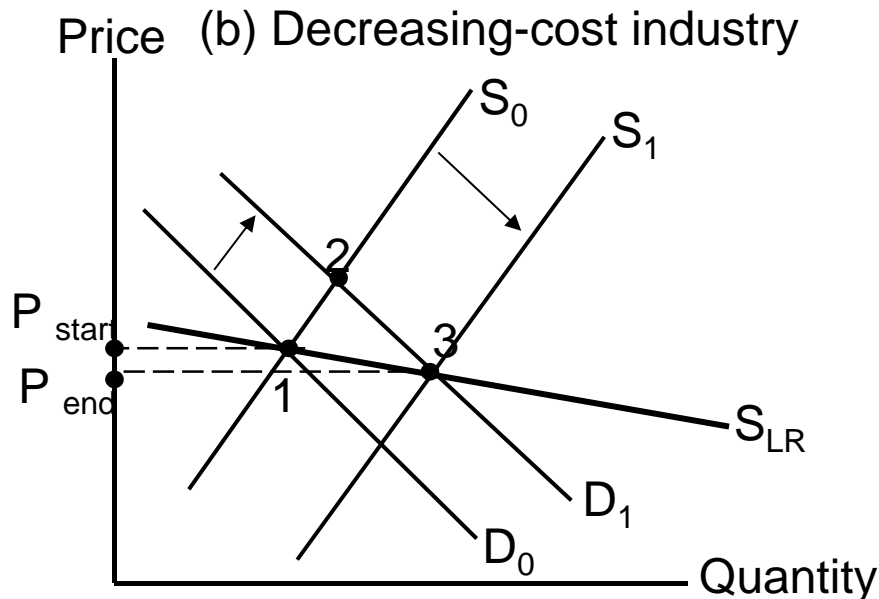
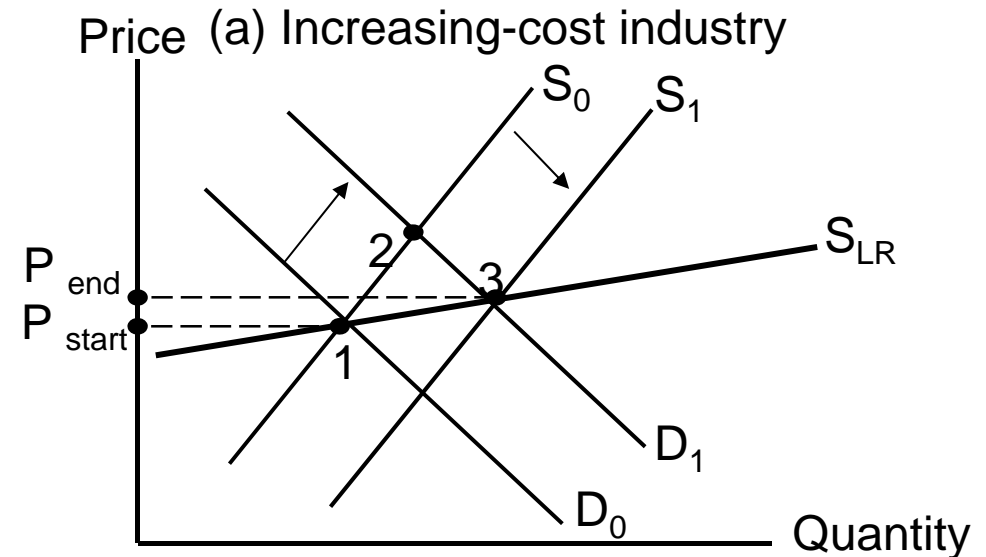
Q	P	TR	TC	Profit	MR	MC
0	1,000	0	550	(550)	-	-
1	995	995	1,000	(5)	995	450
2	990	1,980	1,500	480	985	500
3	985	2,955	2,100	855	975	600
4	980	3,920	2,800	1,120	965	700
5	975	4,875	3,600	1,275	955	800
6	970	5,820	4,600	1,220	945	1,000
7	965	6,755	5,800	955	935	1,200
8	960	7,680	7,200	480	925	1,400
9	955	8,595	8,800	(205)	915	1,600
10	950	9,500	10,800	(1,300)	905	2,000

R15 Example: Profit Maximization and the Breakeven Point under Imperfect Competition

- **Solution to 1:** The breakeven point occurs between unit 1 and unit 2, where profit increases from (5) to 480.
- **Solution to 2:** At an output level of 5 units, the firm maximizes profit in the amount of 1,275, calculated as the difference between TR of 4,875 and TC of 3,600.
- **Solution to 3:** Profit maximization occurs at 5 units, where MR of 955 exceeds MC of 800, which yields a profit contribution of 155. However, at 6 units, MR of 945 is less than the MC of 1,000, resulting in a loss of 55 and a reduction in, profit from 1,275 to 1,220.

R15 Long-Run Industry Supply Curves

- Increasing-cost industry:
 - ✓ 行业产量↑成本↑
 - ✓ 产品价格与供给量成同方向变动
- Decreasing-cost industry:
 - ✓ 行业产量↑成本↓
 - ✓ 产品价格与供给量成反方向变动
- Constant-cost industry:
 - ✓ 行业产量↑成本→
 - ✓ 以不变的均衡价格提供产量



R15 Total, Marginal, and Average Product of Labor

- Total product of labor is the output for a specific amount of labor.
- Average product of labor per worker (or other unit of labor input) is the total product of labor divided by the number of workers (or units of labor employed).
- Marginal product of labor is the addition to the total product of labor from employing one more unit of labor.
 - The usefulness of the total product measure is limited, as it does not measure the efficiency of any one firm.
 - Average product is a measure of overall efficiency, not the efficiency of any one worker.
 - Marginal product is a better measure of the productivity of an individual worker and is preferred over average product or total product.
 - However, average product may be an appropriate measure when it is difficult to determine the productivity of any one worker.

R15 Profit-maximizing Utilization of an Input

- For a firm with N productive inputs, cost minimization requires

$$\frac{MP_1}{P_1} = \frac{MP_2}{P_2} = \dots = \frac{MP_N}{P_N}$$

● 厂商可以通过对要素投入量的不断调整, 使得最后一单位的成本支出无论用来购买哪一种生产要素所获得的边际产量都相等, 从而实现既定成本条件下的最大产量

● The condition for cost minimization does not tell us how much of either input to use to maximize profit.

- Marginal revenue product (MRP) is the monetary value of the marginal product of an input.
- Based on the condition for the profit-maximizing utilization of each factor, $MRP_f = P_f$, for profit maximization, a firm must employ inputs in quantities

$$MRP = MP \times MR$$

$$\frac{MRP_1}{P_1} = \frac{MRP_2}{P_2} = \dots = \frac{MRP_N}{P_N} = 1$$

R15 Example: MRP and Profit Maximization

➤ Example:

- Using the data from the previous case of Canadian Global Electronic Corp, the table below shows the MRP per labor type when product price in Canadian dollars is \$ 0.50. MRP per day is calculated as the MP per type of labor from Example 11 multiplied by the product price.
- Which type of labor contributes the most to profitability?

Type of Labor	Marginal Revenue Product (MRP_{input}) Per Day(\$)	Compensation (P_{input}) per Day(\$)	MRP_{input}/P_{input}
Unskilled (U)	100	100	1.0
Semi-skilled (SS)	250	125	2.0
Skilled (S)	500	200	2.5

R15 Example: MRP and Profit Maximization

- **Solution:**

- ✓ Calculating the MR input/P input values for the different labor categories yields ratio numbers of 1.0, 2.0, and 2.5 for unskilled, semiskilled, and skilled labor, respectively. The firm adds skilled labor first because it is the most profitable to employ, as indicated by MRP_s/P_s being the highest ratio of the three labor inputs.
- ✓ The contribution-to-profit by employing the next skilled worker is \$300, calculated as (\$500 - \$200).
- ✓ However, with the employment of additional skilled workers, MRP_s declines because of diminishing returns that are associated with the MP component. At the point where the skilled labor ratio drops below 2.0—for example, to 1.5—semi-skilled labor becomes feasible to hire because its MRP exceeds its compensation by more than that of skilled labor.
- ✓ Again, the diminishing returns effect decreases MRP when additional semi-skilled workers are hired.
- ✓ In the case of unskilled labor, MRP_u equals the cost of labor; hence, no further contribution to profit accrues from adding this type of labor. In fact, adding another unskilled worker would probably reduce total profit because the next worker's compensation is likely to exceed MRP as a result of a declining MP.
- ✓ The input level that maximizes profit is where $MRP_u/P_u = -MRP_{ss}/P_{ss} = MRP_s/P_s = 1$.

Framework of Economics

➤ SS 4 Microeconomic Analysis

- R13 demand and supply: introduction
- R14 demand and supply: consumer demand introduction
- R15 demand and supply: the firm
- R16 the firm and the market structure

➤ SS 5 Macroeconomic Analysis

- R17 aggregate output, price, and economic growth
- R18 understand business cycles
- R19 monetary and fiscal Policy

➤ SS 6 Economics in a Global Context

- R20 international trade and capital flow
- R21 currency exchange rate

R16 Market Structure

- Identification of market structure
- Perfect competition
- Monopolistic competition
- Oligopoly
- Monopoly
- Concentration measures

R16 Factors that Determine Market Structure

➤ Factors that determine market structure:

- Number of firms and their relative sizes
- Elasticity of the demand curves they face
- Ways that they compete with other firms for sales
- Ease or difficulty with which firms can enter or exit the market

R16 Market Structure

Type	Number of firms	Degree of difference of products	Shape of demand curve	Difficulty to enter or leave	The example in our life
Perfect competition	many	No difference	Horizontal	Very easy	Some agricultural products
Monopolistic competition	many	Some difference	Downward	Relatively easy	Some retail products
Oligopoly	More than one, but not many	Little or no difference	Downward	difficult	Steel, automobile, oil
Pure monopoly	single	Sole product, nearly no substitute	downward	No way	Public sectors

R16 Perfect Competition

- **The assumption of perfect competition**
 - All the firms in the market produce identical products
 - There is a large number of independent firms
 - Each seller is small relative to the size of the total market
 - There are no barriers to entry or exit
- A **price taker** is a firm that cannot influence the market price and that sets its own price at the market price.
- Individual firm's demand schedule is perfectly elastic (horizontal, Price = Demand = Marginal Revenue = Average revenue)
- The key reason why a perfectly competitive firm is that it produces a tiny proportion of the total output of a particular good and buyers are well informed about the prices of other firms.

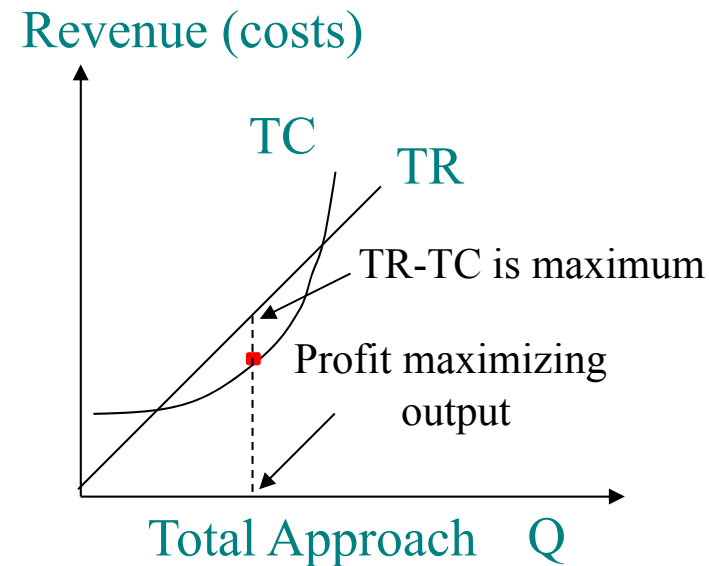
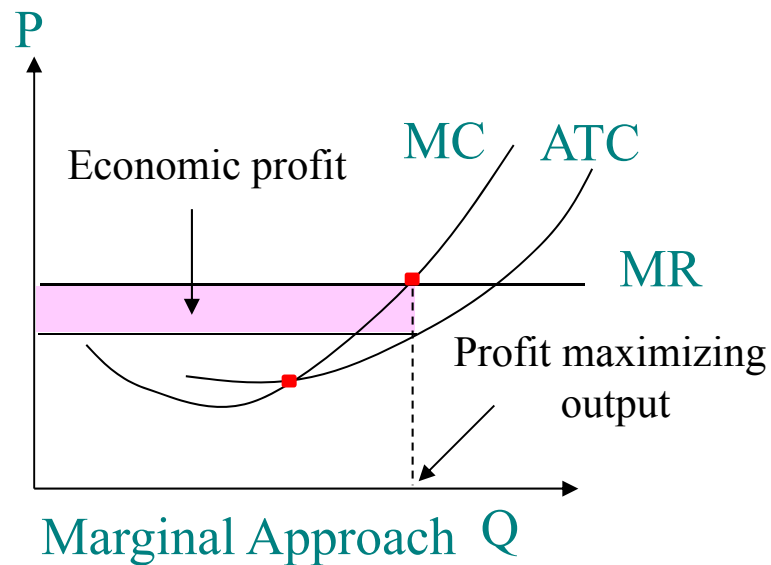
Determine the profit maximizing output:

$MC=MR$ maximize economic profit

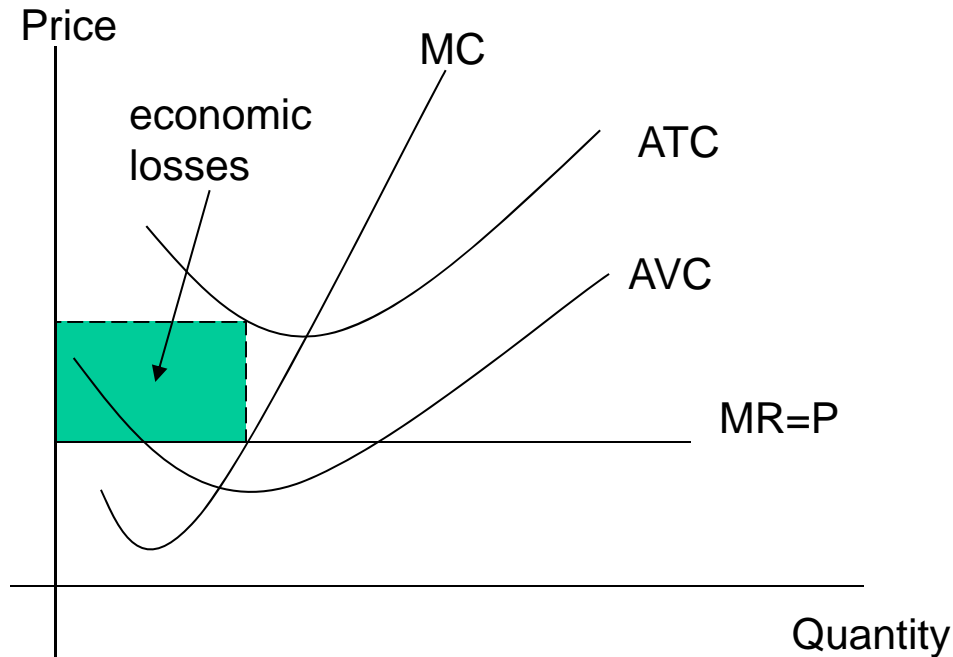
R16 Short-Run Profit Maximization under Perfect Competition

➤ Short-run equilibrium output

- $MR=MC$
- $MR=P=D$ (price taker)
- $DWL=0$, 市场实现最优配置



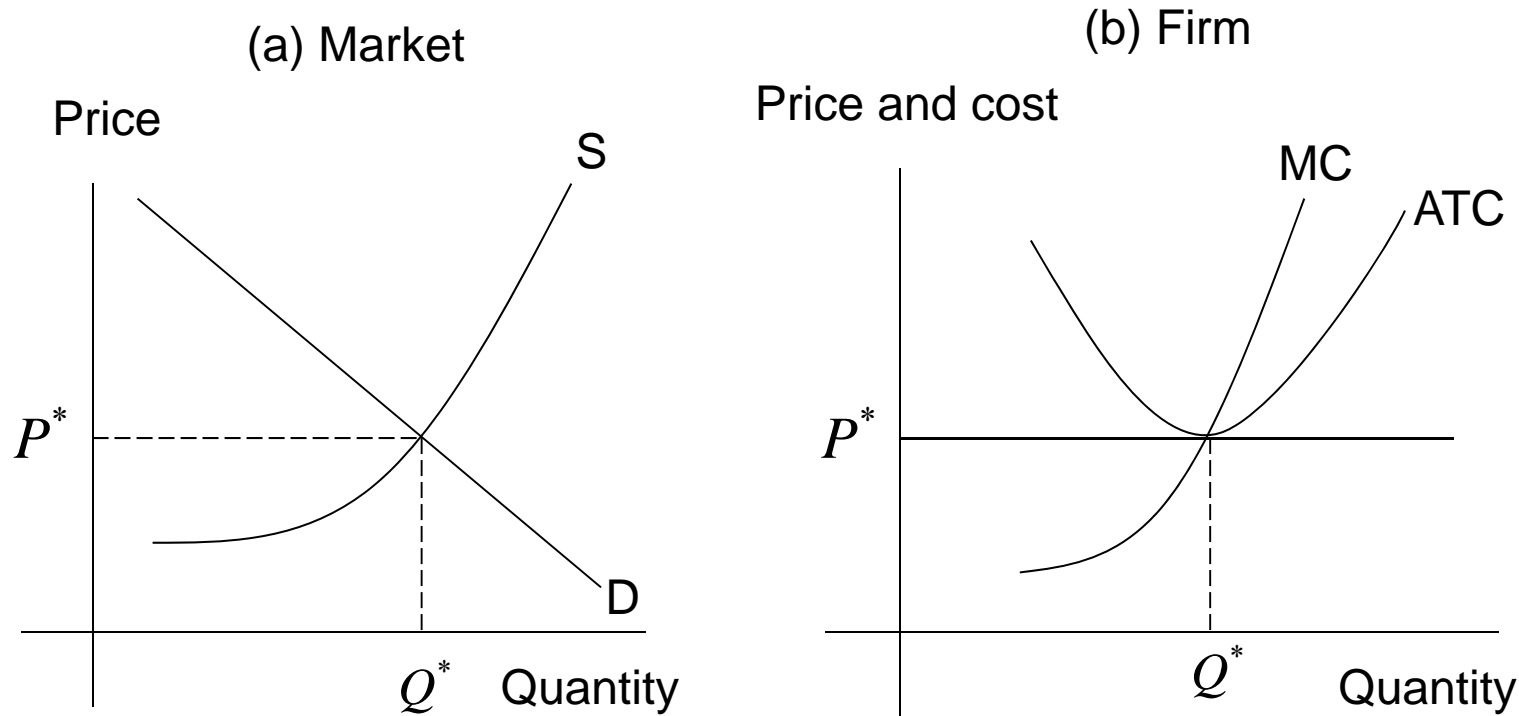
R16 Short-Run Loss under Perfect Competition



➤ Short-run loss

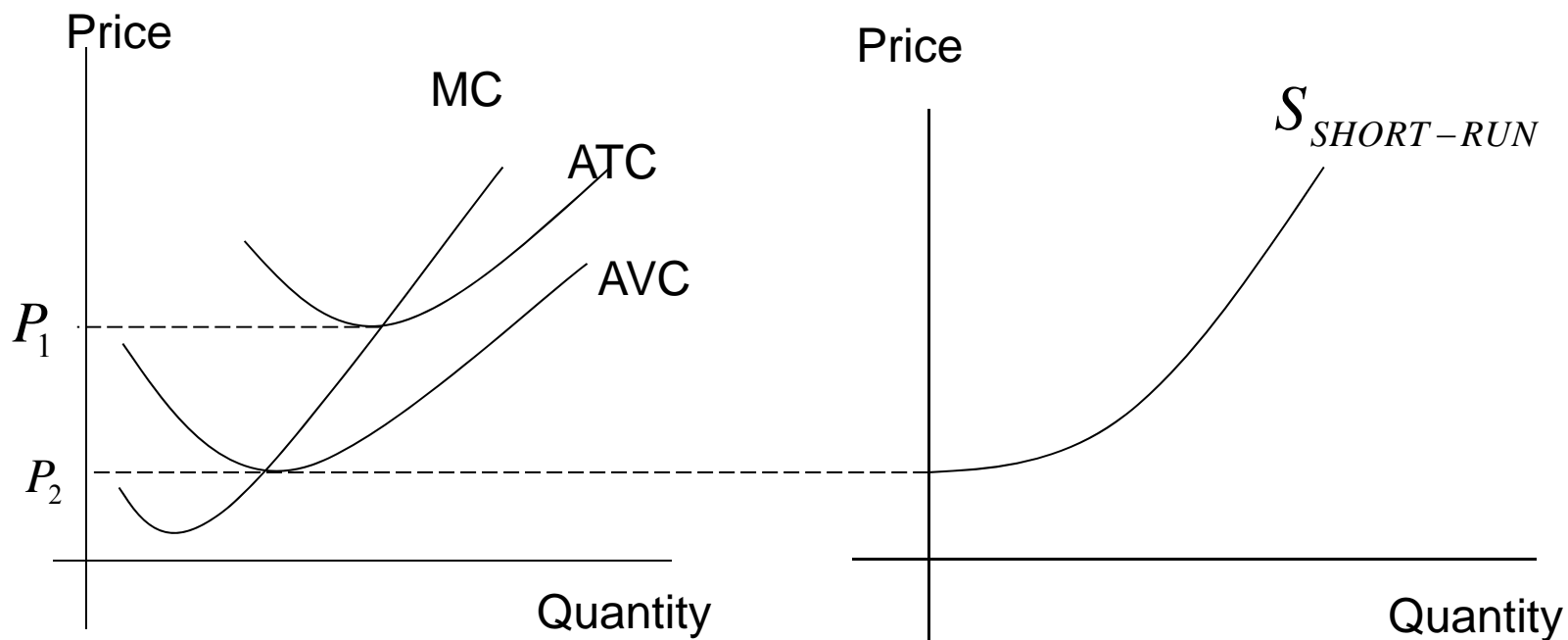
- $P < ATC$: economic loss
- $AVC < P < ATC$: operating in the short-run, exit in the long run
- $P = AVC$: shutdown point
- $P < AVC$: exit in both short-run and long-run

R16 Equilibrium in a Perfectly Competitive Market



- The long-run equilibrium output level for perfectly competitive firms is where $MR=MC=ATC$, which is where ATC is at a minimum. At this output, economic profit is zero and only a normal return is realized.
- In equilibrium, each firm is producing the quantity for which $P=MR=MC=ATC$, so that no firm earns economic profits.

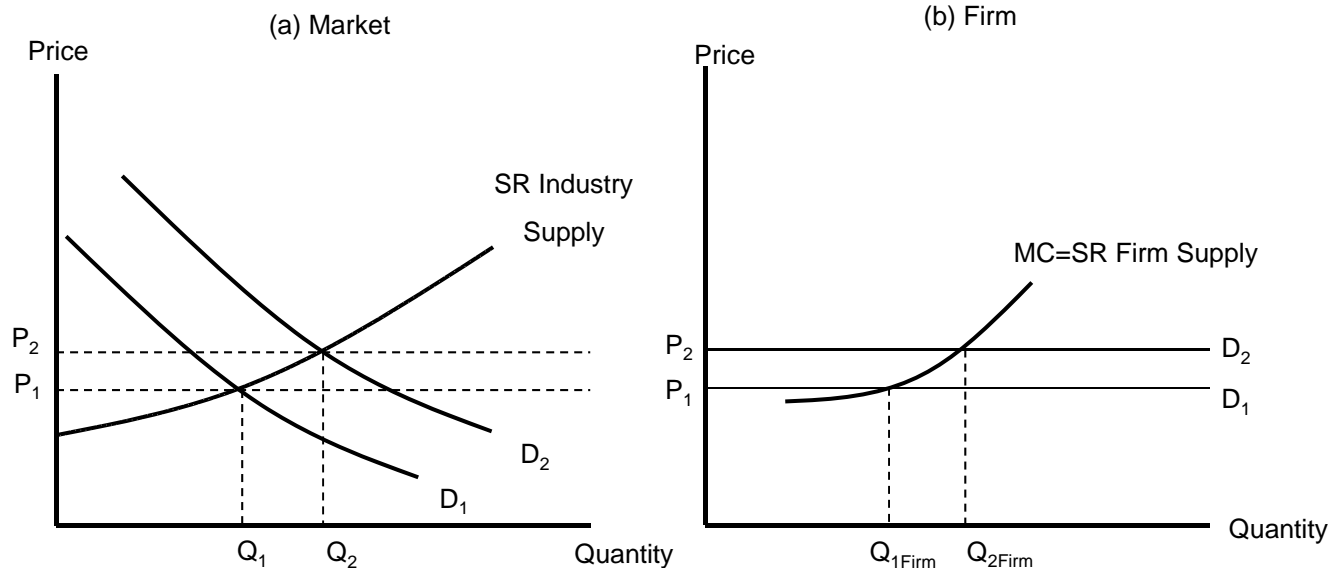
R16 Short-Run Supply Curves under Perfect Competition



- **Short-run supply curve for a firm** is its MC line above the average variable cost curve, AVC.
- **Short-run market supply curve** is the horizontal sum (add up the quantities from all firms at each price) of the MC curves for all firms in a given industry.

R16 Short-Run Change in Demand

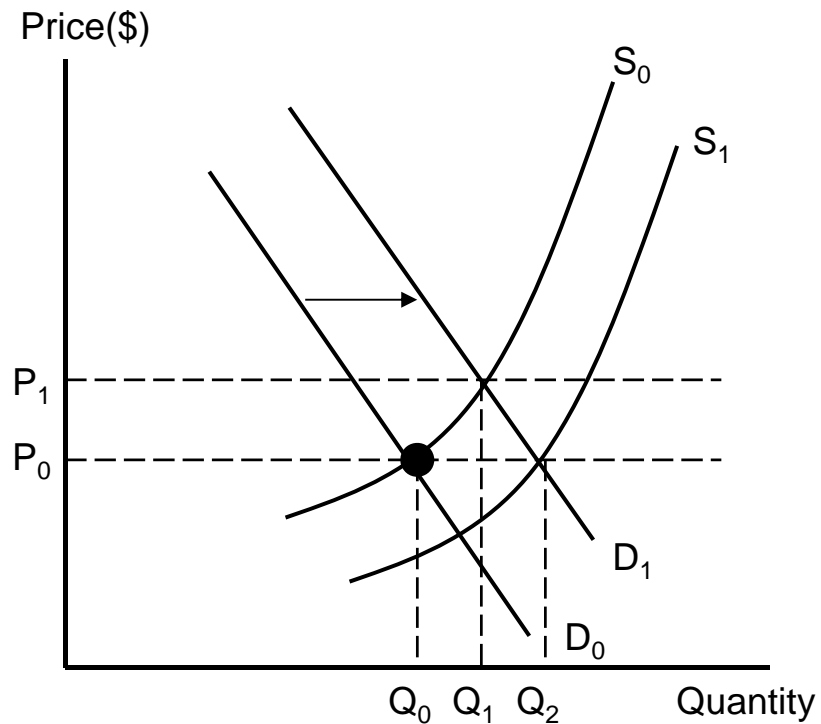
- In the short run, an **increase in market demand** will increase both **equilibrium price and quantity**, while a decrease in market demand will reduce both equilibrium price and quantity.
- In the long run, if firms in an industry are :
 - { earning profits → new firms enter → the firm's profit ↓
 - { experiencing losses → some firms exit → the firm's profit ↑
- *Short-run adjustment to an increase in demand under perfect competition*



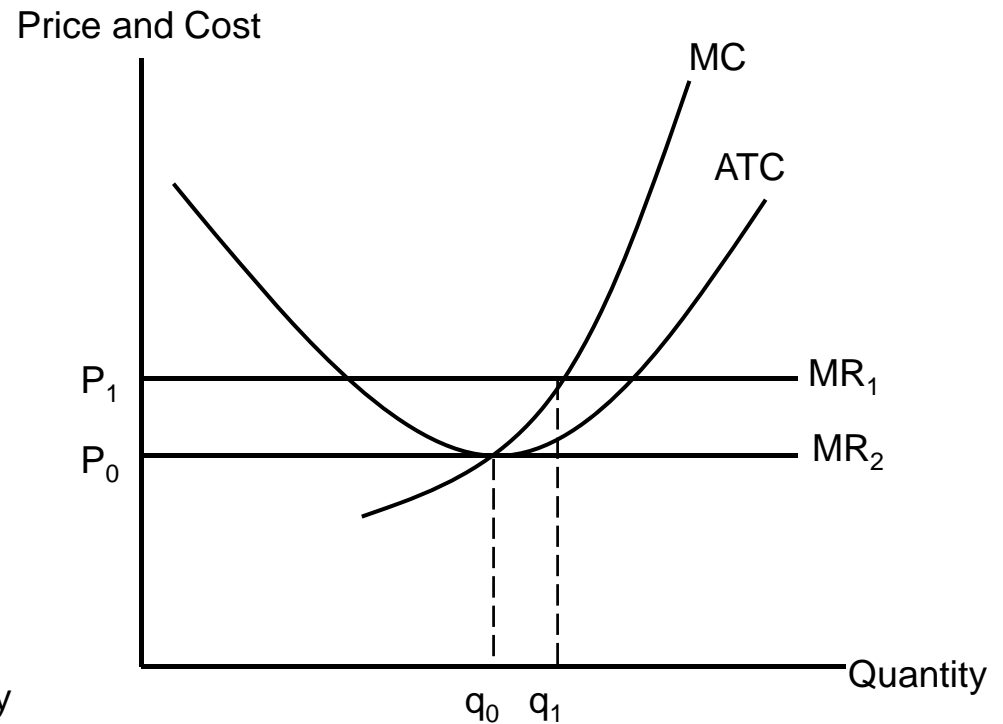
R16 Permanent Change in Demand

➤ *Permanent change in demand*

(a) Industry



(b) Firm

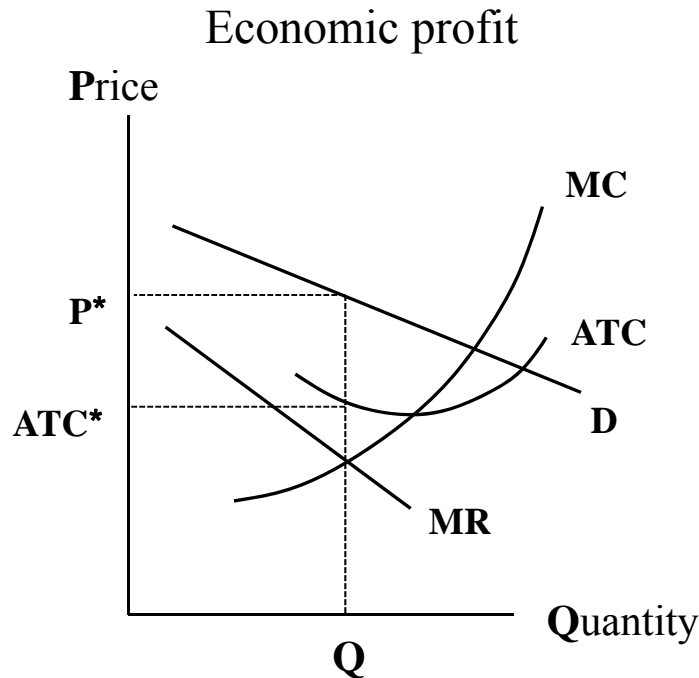


R16 Characteristics of Monopolistic Competition

- The following market and product features define *monopolistic competition*:
- There are a large number of independent sellers.
 - ✓ each firm has relative small market share
 - ✓ firm need only pay attention to average market price
 - ✓ too many firms for collusion to be possible
 - Each seller produces a differentiated product.
 - ✓ The most distinctive factor in monopolistic competition is product differentiation.
 - Firms compete on product quality, price and marketing
 - Firms are free to enter and exit
 - Firms in monopolistic competition face downward-sloping demand curves and the curves are highly elastic because competing products are perceived by consumers as close substitutes

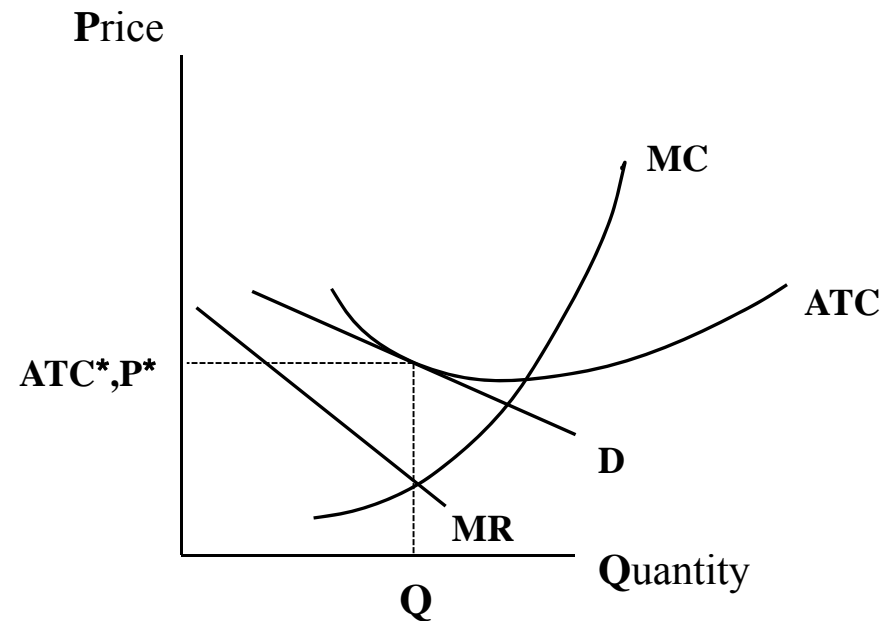
R16 Short-Run and Long-Run Output under Monopolistic Competition

Short-run output decision for a firm



1. $MR=MC$
2. 由此确定Q
3. 计算Economic profit/loss

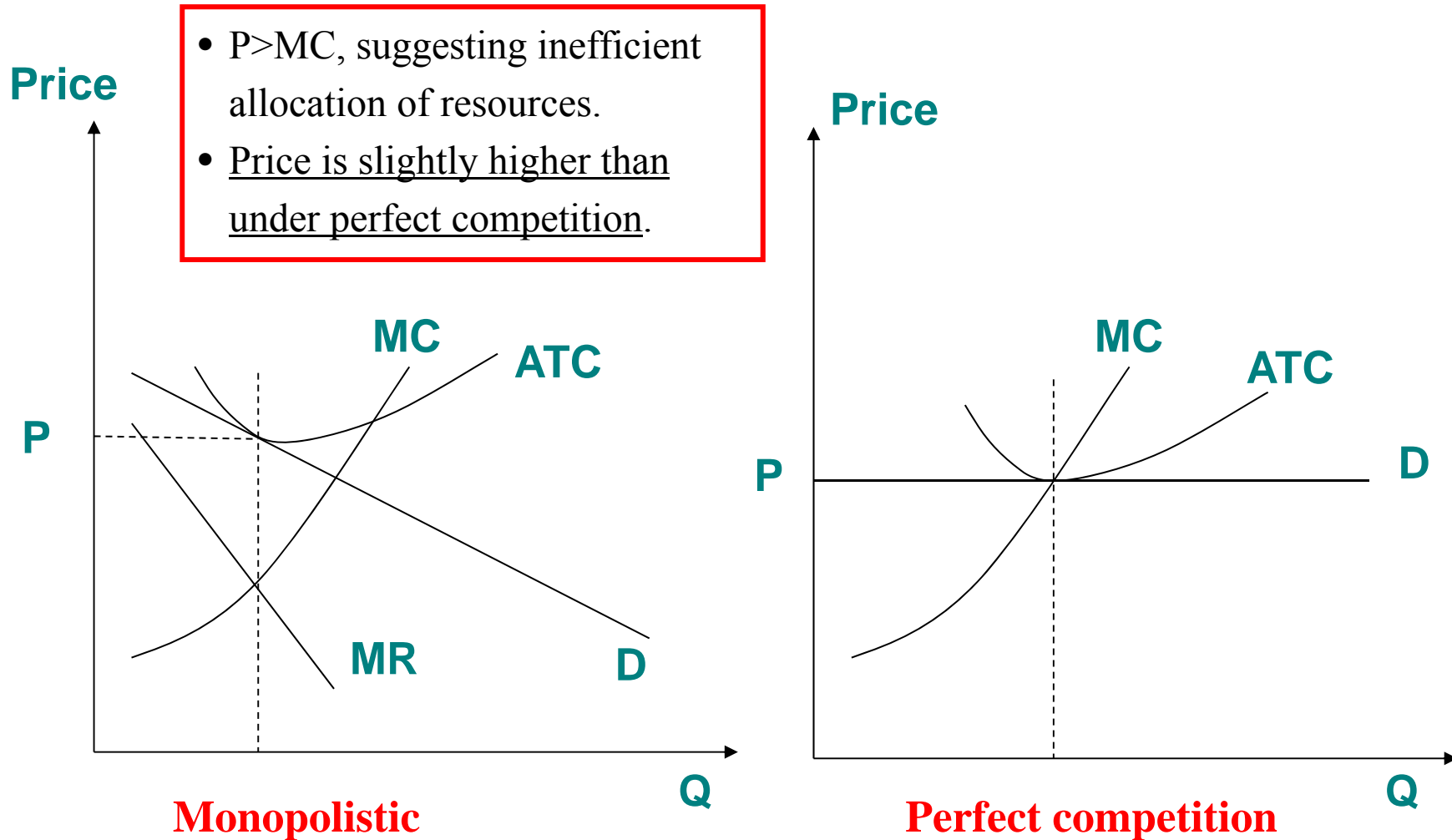
Long-run output decision for a firm



- The entry of new firm shifts the demand curve faced by each individual firm down to the point where $P=ATC$
- No economic profit

R16 Firm Output under Monopolistic and Perfect Competition

Monopolistic Vs. Perfect Competition



R16 Product Development and Marketing

➤ Product development and marketing

● Innovation and product development

- ✓ Less-elastic demand curve, earn economic profit
- ✓ Close substitutes and imitations will eventually erode the initial economic profit
- ✓ Continually look for innovative product features

● Advertising

- ✓ High for firms in monopolistic competition
- ✓ Inform consumers about the unique features of the product
- ✓ Advertising costs are greater, and increase the ATC curve
- ✓ Output increase
- ✓ If advertising leads to enough of an increase in output (sales), it can actually decrease a firm's average total cost

● Brand names

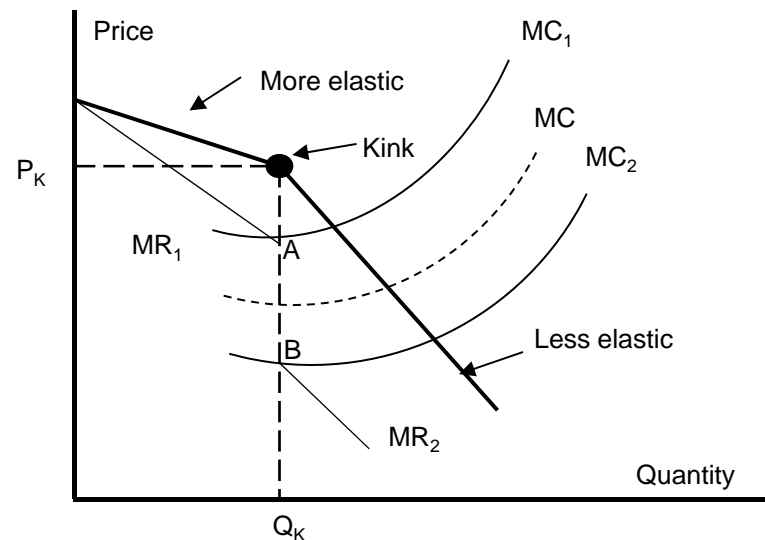
- ✓ Provide information to consumer by providing them with signals about the quality of the branded product.

R16 Oligopoly

- **Oligopoly** is a form of market competition characterized by:
 - a *small number* of sellers
 - interdependence among competitors
 - large economies of scale
 - significant barriers to entry
 - either similar or differentiated products
- Compared to monopolistic competition, an oligopoly market has higher barriers to entry, fewer firms, and, typically, less elastic firm demand curves.
- In contrast to a monopolist, oligopolies are highly dependent upon the actions of their rivals when making business decisions.
- **Four models of oligopoly**
 - Kinked demand curve model
 - Cournot duopoly model
 - Nash equilibrium model (prisoner's dilemma)
 - Stackelberg dominant firm model

R16 Kinked Demand Curve Model

- *The kinked demand curve model of oligopoly* is based on the assumption that each firm believes that if it raises its price, others will not follow, but if it cuts its price, other firms will cut theirs.
- Between range A and B, the optimum Q is constant, can't determine price
 - Q_k is the profit-maximizing level of output and the price at which the kink is located is the firm's profit maximizing price.
 - Shortcoming: it is *incomplete* because what determines the market price (where the kink is located) is outside the scope of the model.



R16 Cournot Model

➤ Cournot model

- only two firms competing (eg: a duopoly)
- both have identical and constant marginal costs of production
- each firm knows the quantity supplied by the other firm in the previous period and assumes that is what it will supply in the next period
- construct a demand curve and marginal revenue curve for its own production
 - ✓ Firms determine their quantities simultaneously each period and, under the assumptions of the Cournot model, these quantities will change each period until they are equal.
 - ✓ When each firm selects the same quantity, there is no longer any additional profit to be gained by changing quantity, and we have a stable equilibrium.
 - ✓ The resulting market price is less than the profit maximizing price that a monopolist would charge, but higher than marginal cost, the price that would result from perfect competition.
 - ✓ More firms are added to the model, the equilibrium market price falls towards marginal cost, which is the equilibrium price in the limit as the number of firms gets large.

R16 Cournot Model

➤ Cournot model could be explained as the following:

- Aggregate market demand: $Q=450-P$, $Q=q_1+q_2$, where q_1 and q_2 represent the output levels of the two firms. The supply function is represented by constant marginal cost $MC=30$. Rearranging the aggregate demand function in terms of price, we get:
 $P=450-Q=450-q_1-q_2$, and $MC=30$
- Total revenue for each of the two firms:
 $TR_1=Pq_1=(450-q_1-q_2)*q_1=450q_1-q_1^2-q_1q_2$
 $TR_2=Pq_2=(450-q_1-q_2)*q_2=450q_2-q_2^2-q_1q_2$
- For the profit-maximizing output, set $MR=MC$, or
 $450-2q_1-q_2=30$ and $450-2q_2-q_1=30$
- Find the simultaneous equilibrium for the two firms by solving the two equations with two unknowns: $450-2q_1-q_2=450-2q_2-q_1$
- Because $q_1=q_2$ under Cournot's assumption, insert this solution into the demand function and solves as: $450-2q_1-q_1=450-3q_1=30$
- Therefore, $q_1=140$, $q_2=140$, and $Q=280$.
- The price is $P=450-280=170$

R16 Nash Equilibrium Model (Prisoner's Dilemma)

- Nash equilibrium is reached when the choices of all firms are such that there is no other choice that makes any firm better off (increases profits or decrease loss)
- Prisoners' Dilemma is a game that illustrates that the best course of action for an oligopoly firm, when engaging in collusion with another oligopoly firm, is to cheat.

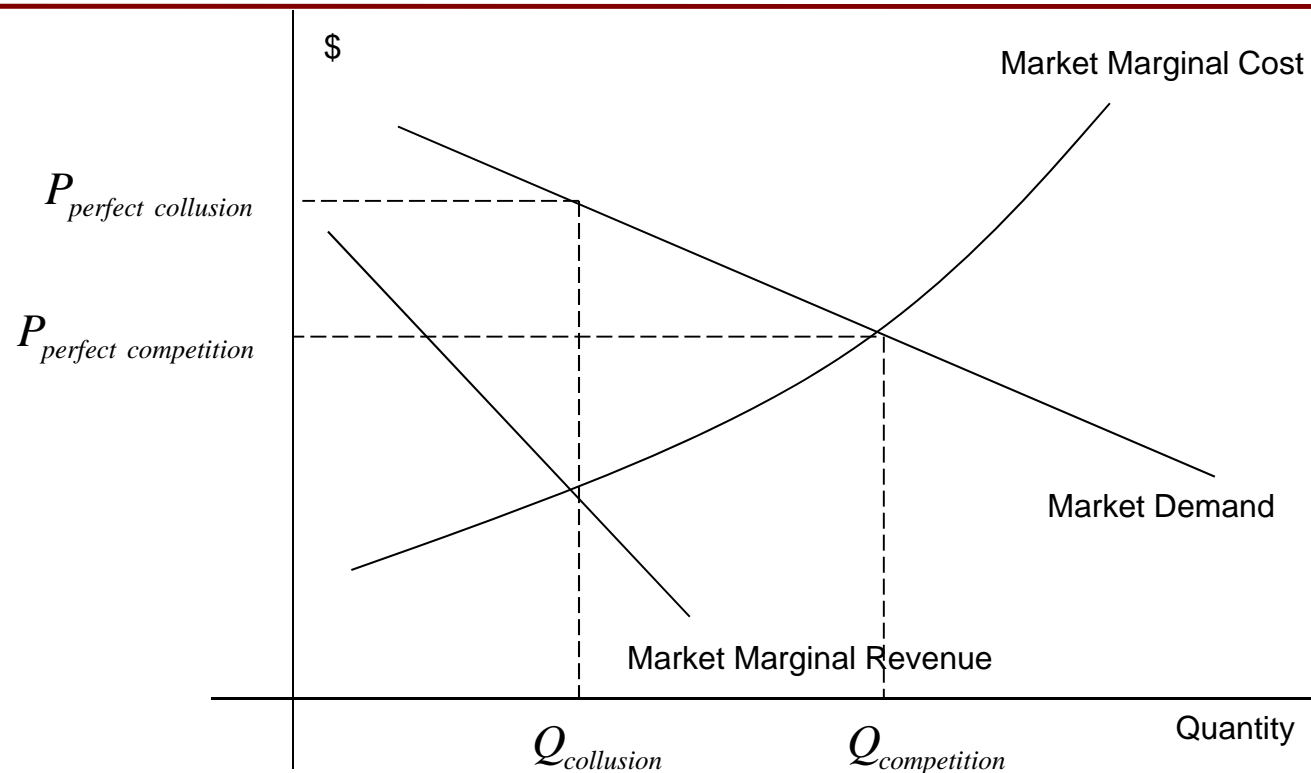
	Prisoner B is silent	Prisoner B confesses
Prisoner A is silent	A gets 6 months B gets 6 months	A gets 10 years B goes free
Prisoner A confesses	A goes free B gets 10 years	A gets 2 years B gets 2 years

- Best overall outcome is for both to remain silent and get sentences of six months. But it is not equilibrium.
- The Nash equilibrium is for both prisoners to confess, and for each to get a sentence of two years.
- Confess/confess is the Nash equilibrium since neither prisoner can unilaterally reduce his sentence by changing to silence.

R16 Collusion

- **Collusion** is when firms make an agreement among themselves to avoid various competitive practices, particularly price competition.
 - If the two parties comply with the collusion, the market is just like a monopoly firm, which will make less outputs and higher price.
 - Collusive agreements to increase price in an oligopoly market will be more successful (have less cheating) when:
 - ✓ There are fewer firms
 - ✓ Products are more similar (less differentiated)
 - ✓ Cost structures are more similar
 - ✓ Purchases are relatively small and frequent
 - ✓ Retaliation by other firms for cheating is more certain and more severe
 - ✓ There is less actual or potential competition from firms outside the cartel

R16 Collusion vs. Perfect Competition

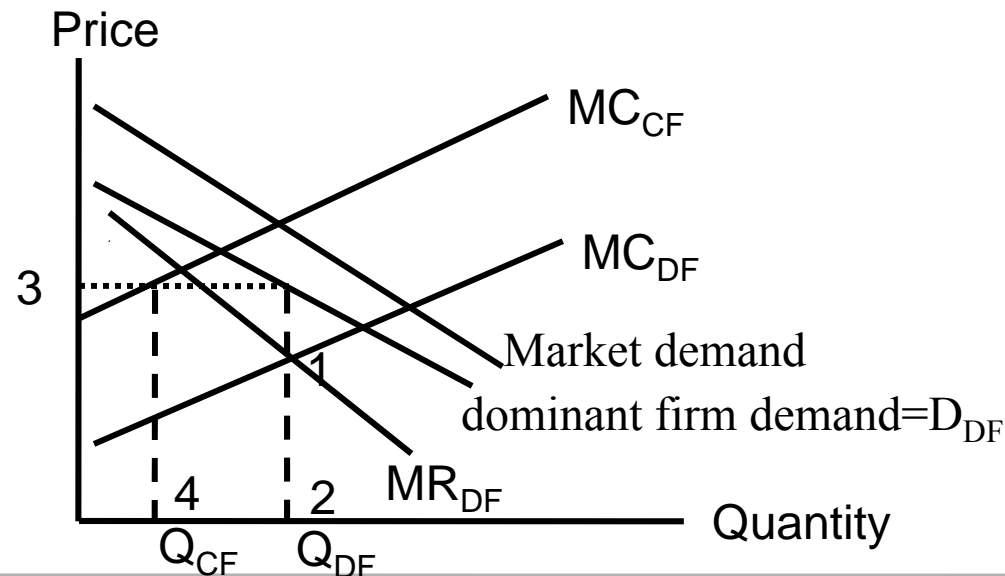


- The resulting price will be between the price based on perfect collusion that would maximize total profits to all firms in the market (actually the monopoly price) and the price that would result from perfect competition and generate zero economic profits in the long run.
 - Two limiting outcomes: $P_{collusion}$ with $Q_{collusion}$ for perfect collusion and $P_{competition}$ and $Q_{competition}$ for perfect competition

R16 Dominant Firm Model

➤ Dominant firm model

- a single firm has a significantly large market share
 - ✓ greater scale
 - ✓ lower cost structure
- market price is essentially determined by the dominant firm
- the other competitive firms take this market price as given.
- The order of decision: 1→2→3→4



R16 Monopoly

➤ **A monopoly is characterized by:**

- a single seller of a well-defined product for which there are no good substitutes
- high barriers to the entry of other firms into the market for the product

➤ **Types of barriers**

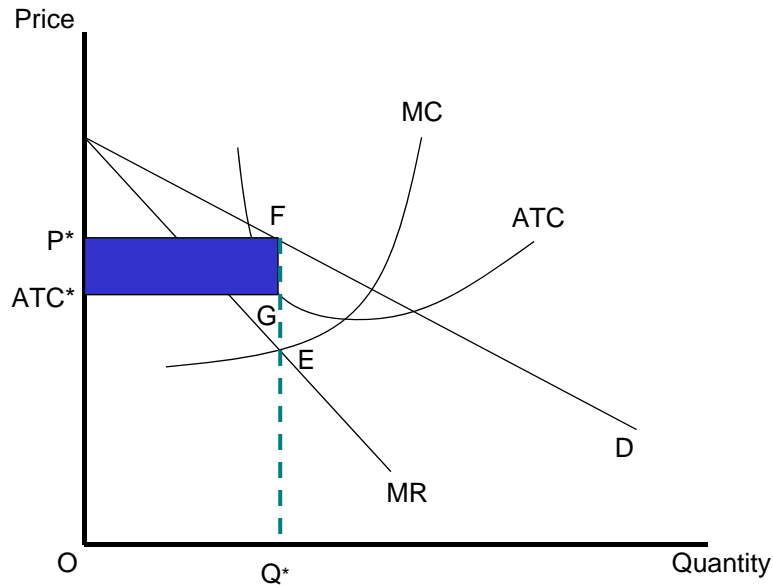
- Legal barriers to entry create legal monopoly. A legal monopoly is a market in which competition and entry are restricted by the granting of a public franchise, government license, patent or copyright.
 - ✓ Example: radio and television station
- Natural barriers to entry create natural monopoly, which is an industry in which one firm can supply the entire market at a lower price than two or more firms can. (Economies of scale)
 - ✓ Example: electric utility

R16 Monopoly

- A monopolist faces a downward sloping demand curve. Just as price searchers with low entry barriers will expand output until $MR=MC$, so do monopolists. This will maximize profit. Positive economic profits can exist in the long run due to the high entry barriers.
- The monopolists want to maximize profits, not price. So they will not charge the highest possible price.
- Monopolists will not make profits if the ATC line is always above the demand curve.
- Compared to a perfect competitive industry, the monopoly firm will produce less total output and charge a higher price.
- Two pricing strategies that possible for a monopoly firm are single-price and price discrimination.

R16 Monopoly

Short-run costs and revenues



- Monopolists are price searchers (face downward sloping demand curves) and have imperfect information about demand, so they must experiment with different prices (search) to find the profit maximizing price/quantity.
- To maximize profit, monopolists will expand output until marginal revenue (MR) equals marginal cost (MC).
- The relationship between MR and price elasticity, E_p , is: $MR = P[1 - 1/E_p]$
- Economic profit = $(P^* - ATC^*) \times Q^*$

R16 Price Discrimination

- **Price discrimination** is the practice of charging different consumers different prices for the same product or service.
 - **first-degree price discrimination**, where a monopolist is able to charge each customer the highest price the customer is willing to pay.
 - ✓ In practice, the monopolist is able to measure how often the product is used and charges the customer the highest price the consumer is willing to pay for that unit of good.
 - ✓ Another possibility is that public price disclosure is non-existent, so that no customer knows what the other customers are paying.
 - ✓ not every consumer is worse off in this case, because some consumers may be charged a price that is below that of perfect competition, as long as the marginal revenue exceeds the marginal cost.
 - **In second-degree price discrimination**, the monopolist offers a menu of quantity-based pricing options designed to induce customers to self-select based on how highly they value the product.
 - ✓ producers can use not just quantity but also the quality to charge more to customers that value the product highly.
 - **Third-degree price discrimination** happens when customers are segregated by demographic or other traits.

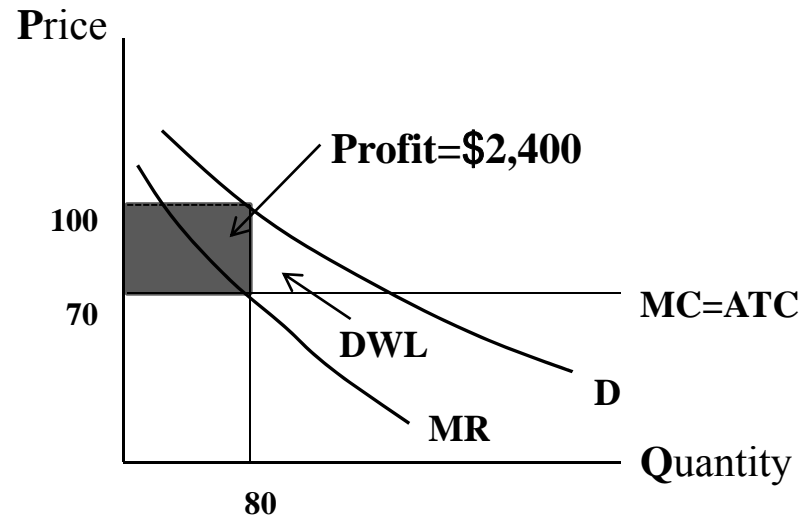
R16 Price Discrimination

- **For price discrimination to work the seller must:**
 - Downward sloping demand curve (price searcher)
 - At least two identifiable groups of customers with different price elasticities of demand for the product
 - Prevent the customers paying the lower price from reselling the product to the customers paying the higher price (no arbitrage)
- **Price discrimination reduces this inefficiency** by increasing output toward the quantity where marginal benefit equals marginal cost, and the deadweight loss is smaller.

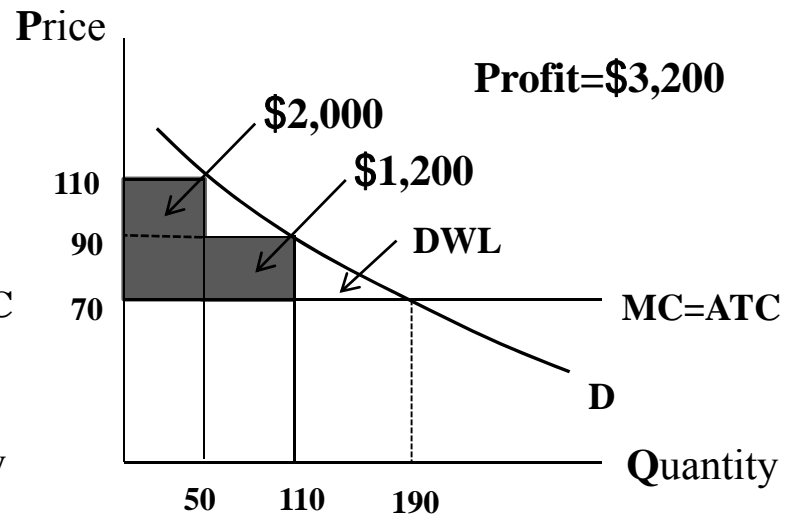
➤ **Extreme Case:** If it were possible for the monopolist to charge each consumer the maximum they are willing to pay for each unit, there would be no deadweight loss, since a monopolist would produce the same quantity as under perfect competition. With perfect price discrimination the consumer surplus would all be captured by the monopolist.

R16 Price Discrimination

(a) Without price discrimination



(b) With price discrimination

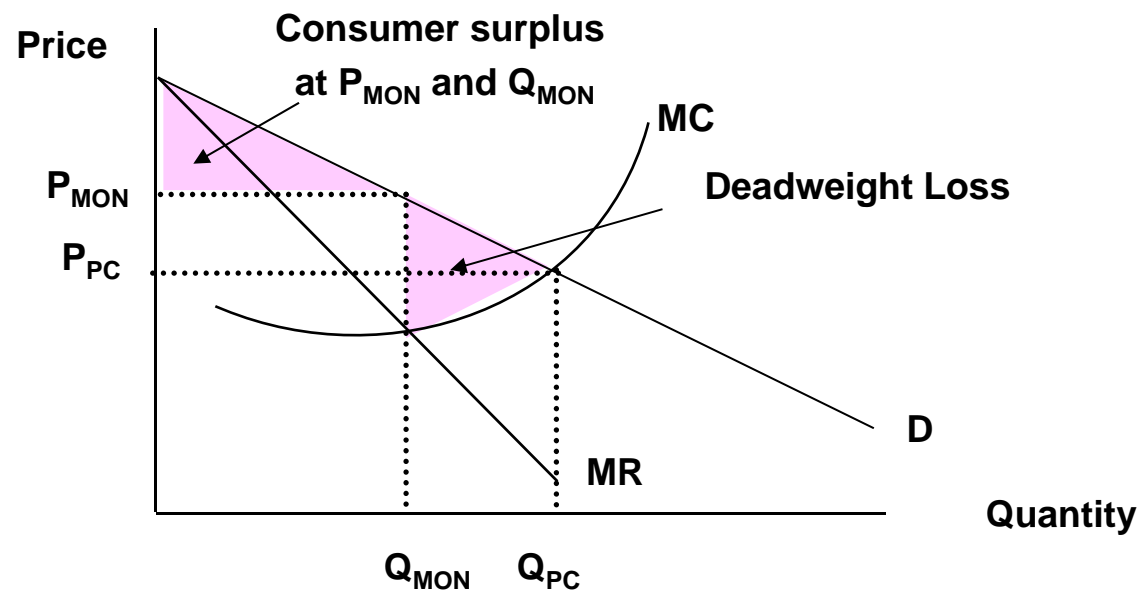


- Company gains from price discrimination: As long as a firm has groups of customers with downward facing demand curves, profits can be increased through price discrimination.
- Winners and losers:
 - Price discrimination reduces the allocative inefficiencies that result from pricing above marginal cost.
 - The major benefit is more output and profit. The firm gains from those customers with inelastic demand curves while still providing goods to customers with more elastic demand curves. This may even cause production to take place when it would not otherwise.

R16 Perfect Competition vs. Monopoly

- Compared with a perfectly competitive industry, the monopoly firm will produce less total output and charge a higher price.
- Monopoly creates a deadweight loss relative to perfect competition.
- A further loss of efficiency results from rent seeking when producers spend time and resources to try to acquire or establish a monopoly.

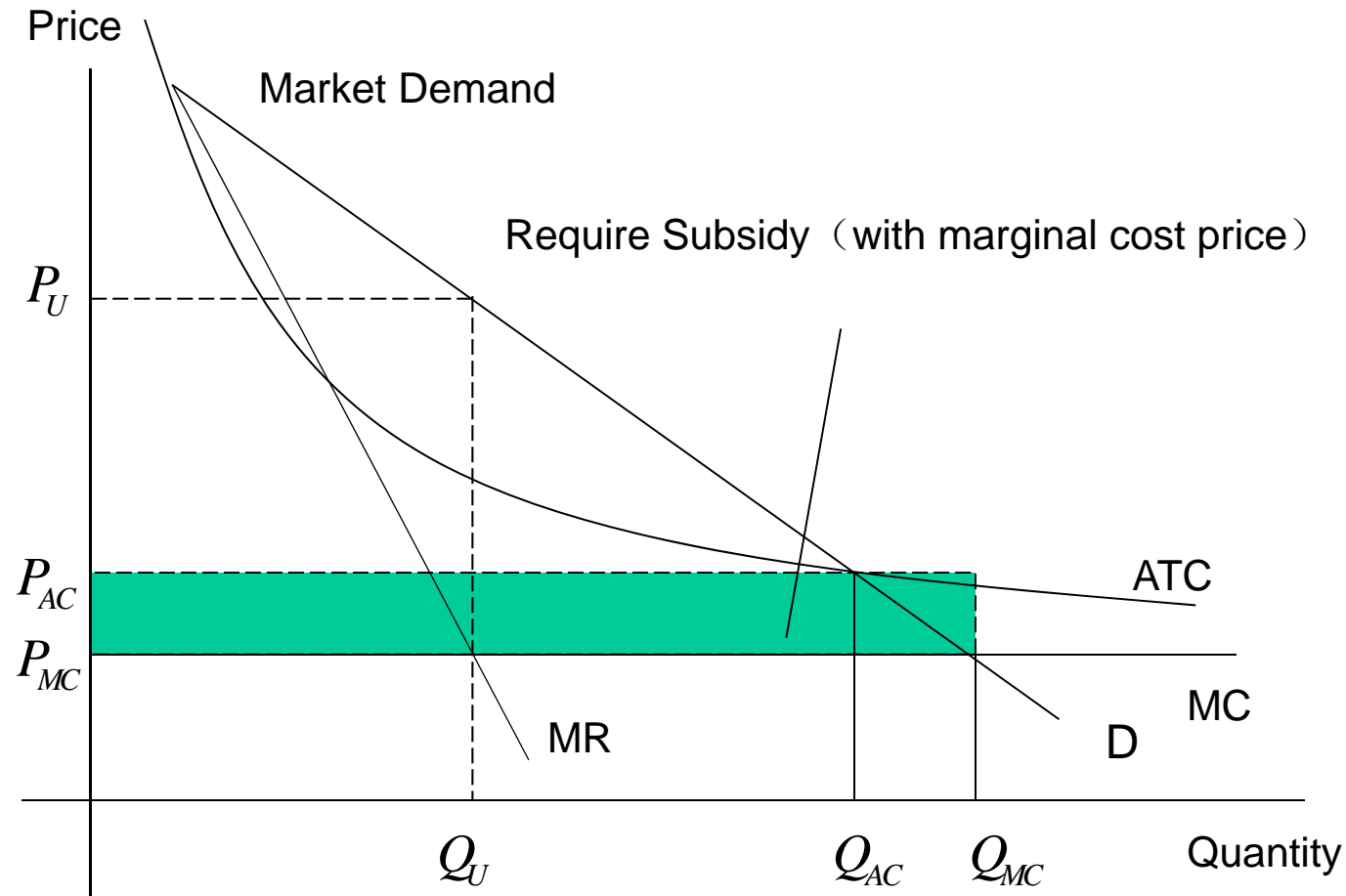
Perfect competition vs. monopoly



R16 Government Regulation

- Regulators often attempt to increase competition and efficiency through efforts to reduce artificial barriers to trade, such as licensing requirement, quotas, and tariffs.
- **Government regulation**
 - **Average cost pricing** is the more common form of regulation at the point where $ATC=D$. This will:
 - ✓ Increase output and decrease price.
 - ✓ Increase social welfare (allocative efficiency).
 - ✓ Ensure the monopolist a normal profit (but no economic profit) since $price=ATC$.
 - **Marginal cost pricing** which is also referred to us *efficient regulation*, forces the monopolist to reduce price to the point where $MC=D$. this will:
 - ✓ Increase output and reduce price.
 - ✓ Causes the monopolist to incur a loss since price is below ATC .
 - ✓ Such a solution requires a government subsidy in order to provide the firm with a normal profit.
 - Another way of “regulating” a monopoly is for the government to **sell the monopoly right to the highest bidder**.

R16 Average Cost Pricing and Marginal Cost Pricing



R16 Monopoly

- Some reasons make government go astray when dealing with problems associated with markets with high barriers to entry.
- ***Lack of information*** (not know the ATC, MC)
 - ***Cost shifting***. The firm has no incentive to reduce costs. (If the firm allows costs to rise, the regulator will allow prices to increase)
 - ***Quality regulations*** (It's easier to regulate price than it is to regulate quality)
 - ***Special interest effect***. The firm may try to influence regulation by political manipulation. (rent-seeking)

R16 Summary - pricing strategy under each market structure

➤ Perfect competition:

- *Profit maximization: $MR=MC$*

✓ And $P=MR=MC$

➤ Monopoly:

- *Profit maximization: $MR=MC$,*

✓ Because the firm's demand curve is downward sloping, $P>MR$

➤ Monopolistic competition:

- *Profit maximization: $MR=MC$*

✓ Because the firm's demand curve is downward sloping, $P>MR$

R16 Summary - pricing strategy under each market structure

➤ Oligopoly:

- Because the key characteristics of oligopoly is the interdependence of firm's pricing and output decisions, the optimal pricing strategy depends on assumptions about the reaction of other firms to each firm's actions.
- Kinked demand curve:
 - ✓ Firms produce Q for which $MR=MC$
 - ✓ Discontinued MC curve, so for many cost structures the optimal Q is the same, given the same demand curve.
- Collusion:
 - ✓ If successful, same as the case in Monopoly
- Dominant firm model:
 - ✓ Dominant firm: $MR=MC$, charge the price on the firm's demand curve
 - ✓ Other firms: take that price and produce the quantity for which $MC=P$

R16 Summary - pricing strategy under each market structure

➤ Oligopoly: (cont'd)

● Game theory:

- ✓ Reaction of competitors determine the optimal output and pricing strategy.
- ✓ Given the variety of models and assumptions about competitor reactions, the long-run outcome is indeterminate: $P_{PC} < P < P_{MON}$

R16 Concentration Measures

➤ Concentration measures

- **Elasticity of demand**, difficult
- **The N-Firm Concentration Ratio**: the sum or the percentage market shares of the largest N firms in a market.
 - ✓ advantage: simple to compute
 - ✓ disadvantage: does not directly quantify market power
 - ✓ limitation: it may be relatively insensitive to mergers of two firms with large market shares.
- **The Herfindahl-Hirschman Index (HHI)**: the sum of the squares of the market shares of the largest firms in the market.
 - ✓ limitation: both of our simple concentration measures is that barriers to entry are not considered in either case. Even a firm with high market share may not have much pricing power if barriers to entry are low and there is potential competition.



R16 Summary for Characteristics of Market Structure

	Perfect Competition	Monopolistic Competition	Oligopoly	Monopoly
Number of sellers	Many firms	Many firms	Few firms	Single firm
Barriers to entry	Very low	Low	High	Very high
Nature of substitute products	Very good substitutes	Good substitutes but differentiated	Very good substitutes or differentiated	No good substitutes
Nature of competition	Price only	Price, marketing, features	Price, marketing, features	Advertising
Pricing power	None	Some	Some to significant	Significant

Framework of Economics

➤ SS 4 Microeconomic Analysis

- R13 demand and supply: introduction
- R14 demand and supply: consumer demand introduction
- R15 demand and supply: the firm
- R16 the firm and the market structure

➤ SS 5 Macroeconomic Analysis

- R17 aggregate output, price, and economic growth
- R18 understand business cycles
- R19 monetary and fiscal Policy

➤ SS 6 Economics in a Global Context

- R20 international trade and capital flow
- R21 currency exchange rate

R17 Aggregate Output, Prices and Economic Growth

- GDP
- IS curve and LM curve
- Aggregate demand and aggregate supply
- Economic growth and sustainability

R17 Gross domestic product (GDP)

- **Gross domestic product (GDP)** is the total market value of the final goods and services produced in a country within a certain time period.
- Include:
 - ✓ Purchases of newly produced goods and services
 - ✓ Final goods and services
 - ✓ Goods and services provided by government at cost to government (e.g. the services provided by police and the judiciary, and goods such as roads and infrastructure improvements)
 - ✓ The value of owner-occupied housing, just as including the value of rental housing service.
 - Exclude:
 - ✓ The sale or resale of goods produce in precious period
 - ✓ Transfer payments made by the government (e.g. unemployment, retirement, and welfare benefits)
 - ✓ In-process goods
 - ✓ The value of labor not sold (e.g. homeowner's repairs to his own home)
 - ✓ By-products of production (e.g. environmental damage)
 - ✓ Underground economy
 - ✓ Barter transaction (e.g. neighbors exchanging services with each other)
 - ✓ Illegal trade

R17 GDP Calculation

- GDP can be calculated as the sum of all the spending on newly produced goods and services, or as the sum of the income received as a result of producing these goods and services.
 - Under the ***expenditure approach***, GDP is calculated by summing the amounts spent on goods and services produced during the period.
 - Under the ***income approach***, GDP is calculated by summing the amounts earned by households and companies during the period, including wage income, interest income, and business profits.
- For the whole economy, total expenditures and total income must be equal, so the two approaches should produce the same result.

R17 GDP Measurement

- **The Value-of-Final-Output Method** (以最终产品的价格计算OUTPUT)
 - Expenditure Approach—summing the values of all final goods and services produced.
- **The Sum-of-Value-Added Method** (以原材料和中间附加值累和计算OUTPUT)
 - summing the additions to value created at each stage of production and distribution. An example of the calculation for a specific product is presented in the following figure.

Value of Final Product Equals Income Created			
	Receipts at Each Stage (€)	Value Added (=Income Created) at Each Stage (€)	
Receipts of farmer from miller	0.15	0.15	Value added by farmer
Receipts of miller from baker	0.46	0.31	Value added by miller
Receipts of baker from retailer	0.78	0.32	Value added by baker
Receipts of retailer from final customer	<u>1.00</u>	<u>0.22</u>	Value added by retailer
	1.00	1.00	
	Value of final output	Total value added = Total income created	

R17 Example: GDP Measurement

➤ Example:

Contribution of Automobile Production to GDP

Exhibit provides simplified information on the cost of producing an automobile in the United States at various stages of the production process. The example assumes the automobile is produced and sold domestically and assumes no imported material is used. Calculate the contribution of automobile production to GDP using the value-added method, and show that it is equivalent to the expenditure method. What impact would the use of imported steel or plastics have on GDP?

Cost of Producing Automobiles	
Stage of Production	Sales Value(\$)
1. Production of basic materials	
Steel	1,000
Plastics	3,000
Semiconductors	1,000
2. Assembly of automobile (manufacturer price)	15,000
3. Wholesale price for automobile dealer	16,000
4. Retail price	18,000

R17 Example: GDP Measurement

➤ Solution:

GDP includes only the value of final goods and ignores intermediate goods in order to avoid double counting. Thus, the final sale price of \$18,000 and not the total sales value of \$54,000 (summing sales at all the levels of production) would be included in GDP. Alternatively, we can avoid double counting by calculating and summing the value added at each stage. At each stage of production, the difference between what a company pays for its inputs and what it receives for the product is its contribution to GDP. The value added for each stage of production is computed as follows:

Stage of Production	Sales Value(\$)	Value Added(\$)
1.production of basic materials		
Steel	1,000	1,000
Plastics	3,000	3,000
Semiconductors	1,000	1,000
Total Inputs		5,000(sum of 3 inputs)
2.Assembly of car (manufacturer price)	15,000	10,000=(15,000-5,000)
3.Wholesale price for car dealer	16,000	1,000=(16,000-15,000)
4. Retail price	18,000	2,000=(18,000-16,000)
Total expenditures	18,000	
Total value added		18,000

Thus, the sum of the value added by each stage of production is equal to \$18,000, which is equal to the final selling price of the automobile. If some of the inputs (steel, plastics, or semiconductors) are imported, the value added would be reduced by the amount paid for the imports.

R17 Nominal and Real GDP and Per-Capita Real GDP

- **Nominal GDP** is simply GDP as we have described it under the expenditures approach: the total value of all goods and services produced by an economy, valued at current market prices. For an economy with N different goods and services, we can express nominal GDP as:

$$\begin{aligned}\text{nominal GDP}_t &= \sum_{i=1}^N P_{i,t} Q_{i,t} \\ &= \sum_{i=1}^N (\text{price of good } i \text{ in year } t) \times (\text{quantity of good } i \text{ produced in year } t)\end{aligned}$$

- **Real GDP** is calculated relative to a base year. By using base-year prices and current-year output quantities, real GDP growth reflects only increases in total output, not simply increases (or decreases) in the money value of total output.

$$\begin{aligned}\text{real GDP}_t &= \sum_{i=1}^N P_{i,t-5} Q_{i,t} \\ &= \sum_{i=1}^N (\text{price of good } i \text{ in year } t-5) \times (\text{quantity of good } i \text{ produced in year } t)\end{aligned}$$

- **Per-capita real GDP** is defined as real GDP divided by population and is often used as a measure of the economic well-being of a country's residents.

R17 GDP Deflator

- Implicit price deflator for GDP (GDP deflator) is a price index that can be used to convert nominal GDP into real GDP, taking out the effects of changes in the overall price level.

➤ GDP deflator for year $t = \frac{\sum_{i=1}^N P_{i,t} Q_{i,t}}{\sum_{i=1}^N P_{i,t-5} Q_{i,t}} \times 100$

$$= \frac{\text{nominal GDP in year } t}{\text{value of year } t \text{ output at year } t-5 \text{ prices}} \times 100$$

R17 Example: Calculating and Using the GDP Deflator

➤ Example: Calculating and using the GDP deflator

1. GDP in 20X2 is \$1.80 billion at 20X2 prices and \$1.65 billion when calculated using 20X1 prices. Calculate the GDP deflator using 20X1 as the base period.
2. Nominal GDP was \$213 billion in 20X6 and \$150 billion in 20X1. The 20X6 GDP deflator relative to the base year 20X1 is 122.3. Calculate real GDP for 20X6 and the compound annual real growth rate of economic output from 20X1 to 20X6.

➤ Answer:

1. GDP deflator = $1.8 / 1.65 \times 100 = 109.1$, reflecting a 9.1% increase in the price level.
2. Real GDP 20X6 = $\$213 / 1.223 = \174.16 .

Noting that real and nominal GDP are the same for the base year, the compound real annual growth rate of economic output over the 5-year period is:

$$\left(\frac{174.16}{150} \right)^{\frac{1}{5}} - 1 = 3.03\%$$

R17 GDP Calculation

- Using the **expenditure approach**, the major components of real GDP are consumption, investment, government spending, and **net exports** (exports minus imports). These components are summarized in the equation:

$$\text{GDP} = C + I + G + (X - M)$$

- Under **the income approach**, we have the following equation for GDP:

$$\begin{aligned} \text{GDP} = & \text{national income} + \text{capital consumption allowance} \\ & + \text{statistical discrepancy} \end{aligned}$$

- **A capital consumption allowance (CCA)** measures the depreciation (i.e., wear) of physical capital from the production of goods and services over a period. **CCA** can be thought of as the amount that would have to be reinvested to maintain the productivity of physical capital from one period to the next.
- **The statistical discrepancy** is an adjustment for the difference between GDP measured under the income approach and the expenditure approach because they use different data.

R17 National Income, Personal Income, and Personal Disposable Income

- National income is the sum of the income received by all factors of production that go into the creation of final output.
 - **national income** = compensation of employees (wages and benefits)
 - + corporate and government enterprise profits before taxes
 - + interest income
 - + unincorporated business net income (business owners' incomes)
 - + rent
 - + indirect business taxes less subsidies*
- *indirect taxes and subsidies that are included in final prices, 产品中的税主要包括 sales taxes, fuel taxes, and import duties; 要素生产中的税主要包括 property taxes and payroll taxes.*
- Personal income = national income - indirect business tax - corporate income tax - undistributed corporate profit + Transfer payment
- Personal disposable income = personal income - personal taxes

R17 Saving, Investment, the Fiscal Balance and the Trade Balance

- Total expenditures can be stated as $GDP = C + I + G + (X - M)$. ①
- Total income, which must equal total expenditures, can be stated as:

$$GDP = C + S + T \quad \text{②}$$

where:

C = consumption spending

S = household and business savings

T = net taxes (taxes paid minus transfer payments received)

$$\text{①} = \text{②} \rightarrow S = I + (G - T) + (X - M)$$

Fiscal balance

Trade balance

Also we can get: $(G - T) = (S - I) - (X - M)$

- A government deficit ($G - T > 0$) must be financed by some combination of a trade deficit ($X - M < 0$) or an excess of private saving over private investment ($S - I > 0$).

R17 Components of GDP

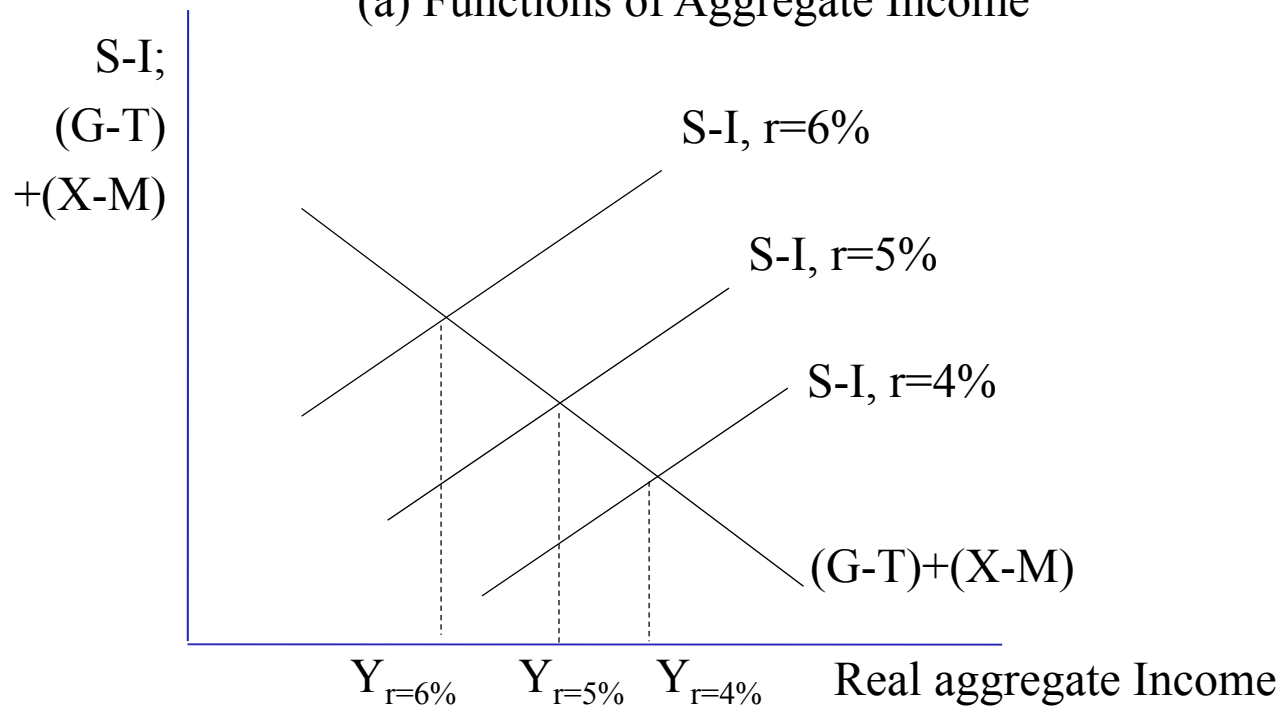
- To derive the aggregate demand curve, we need to understand the factors that determine each of the components of GDP:
- **Consumption** is a function of disposable income. An increase in personal income or a decrease in taxes will increase both consumption and saving. Additional disposable income will be consumed or saved. The proportion of additional income spent on consumption is called the marginal propensity to consume (MPC), and the proportion saved is the marginal propensity to save (MPS). $MPC + MPS = 1$
 - **Investment** is a function of expected profitability and the cost of financing. Expected profitability depends on the overall level of economic output. Financing costs are reflected in real interest rates, which are approximated by nominal interest rates minus the expected inflation rate.
 - **Government purchases** may be viewed as independent of economic activity to a degree, but tax revenue to the government, and therefore the fiscal balance, is clearly a function of economic output.
 - **Net exports** are a function of domestic disposable incomes (which affect imports), foreign disposable incomes (which affect exports), and relative prices of goods in foreign and domestic markets.

R17 IS Curves

➤ The IS Curve

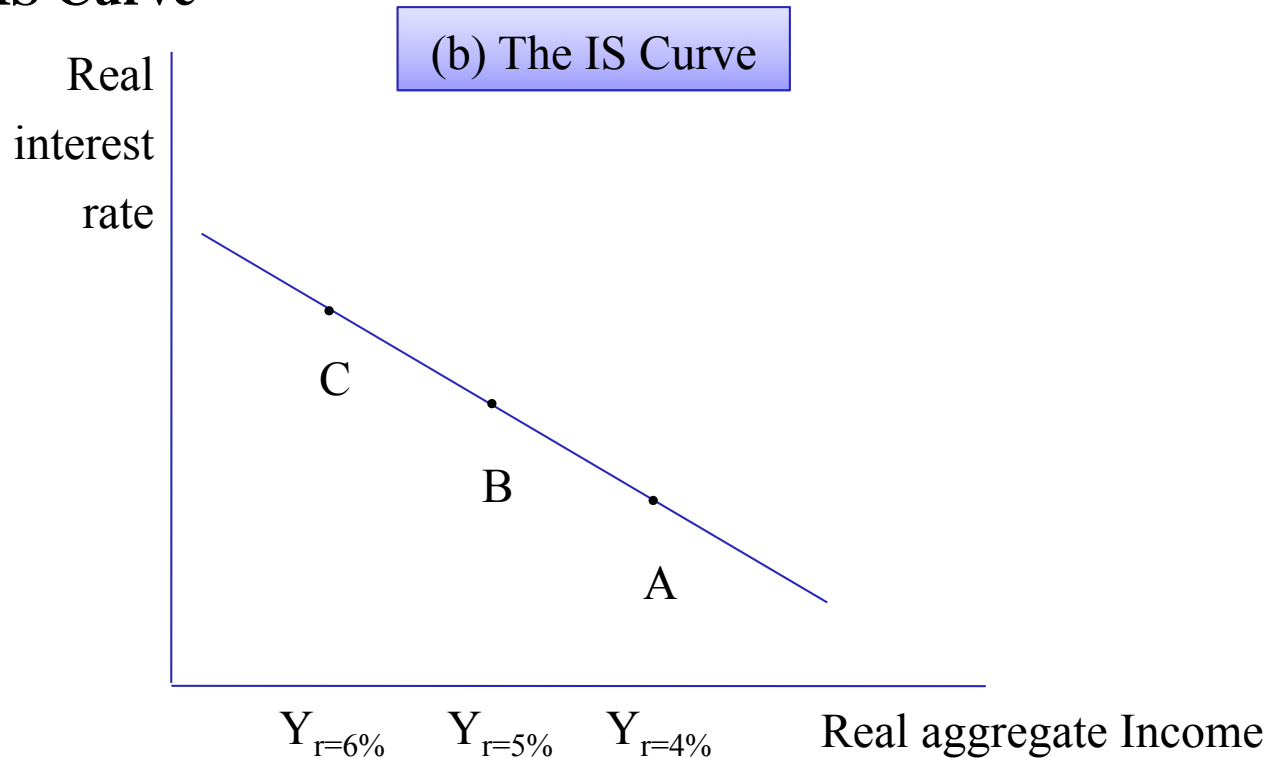
- From the fundamental relationship among saving, investment, the fiscal balance and the trade balance, $S = I + (G - T) + (X - M)$, and subtracting I from both sides, we get: $(S - I) = (G - T) + (X - M)$

(a) Functions of Aggregate Income



R17 IS Curves

➤ The IS Curve



If income and expenditure are to remain in equilibrium, there must be an *inverse relationship between the real interest rate and income*. In economics, this relationship is called the IS curve, because investment (I) and savings (S) are the primary variables that adjust to maintain the balance between expenditure and income.

R17 LM Curves

➤ The LM Curve

- By examining the relationships between supply and demand in the financial markets, we can derive the **LM curve**. The LM curve shows the combinations of GDP or real income (Y) and real interest rate (r) that keep the quantity of real money demanded equal to the quantity of real money supplied.

➤ We begin with the **quantity theory of money**, which states the following:

$$MV = PY$$

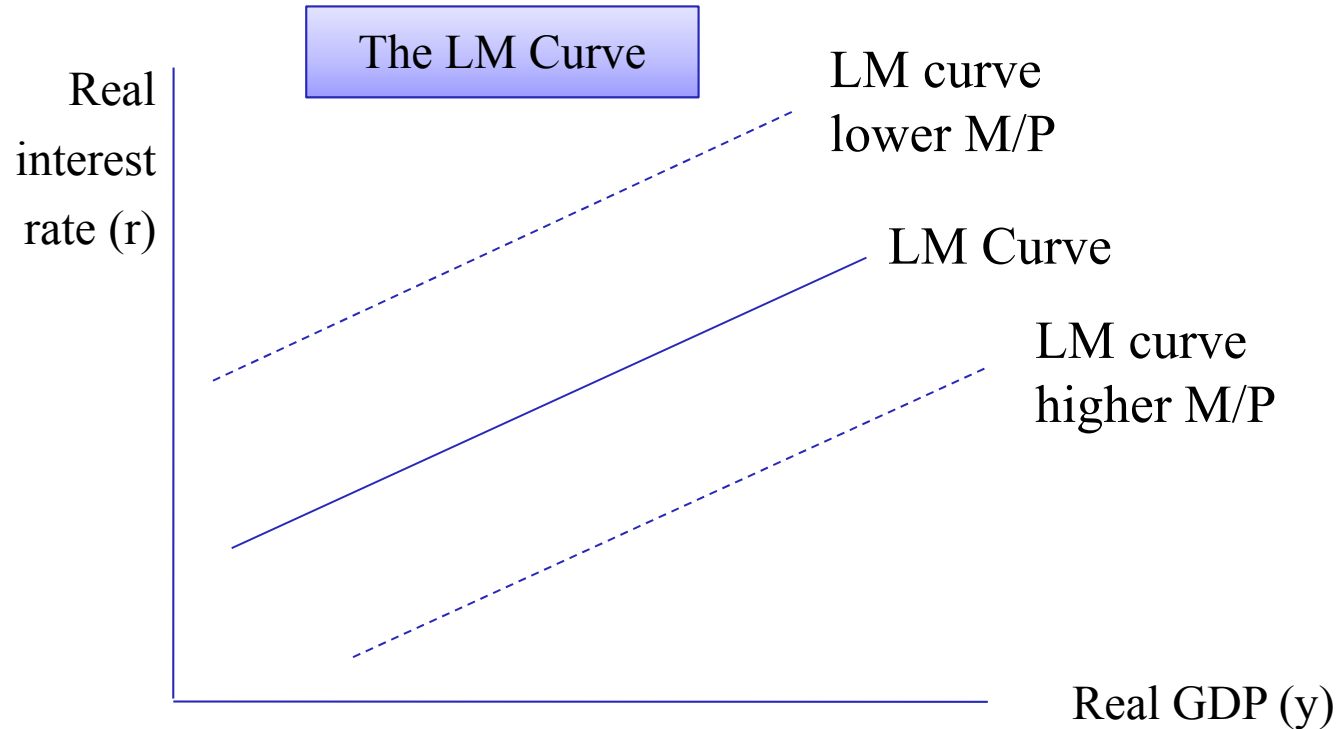
where: M = money supply; V = velocity of money in transactions

P = price level; Y = real GDP

- The real money supply is M/P , the nominal money supply divided by the price level. If we solve the quantity theory equation for M/P , we get: $M/P = (1/V) * Y$.
- We can interpret $1/V$ as the fraction of real incomes that people desire to hold in the form of cash balances (money).
 - ✓ Demand for money is inversely related to the real interest rate. The higher the real interest rate, the less willing people are to hold cash balances, which do not earn interest; they prefer to hold more interest-bearing securities and less cash.
 - ✓ While demand for money decreases when real interest rates increase, demand for money increases when real income increases.
- If we hold the real money supply (M/P) constant, the increase in demand for real money from an increase in real income must be offset by a decrease in demand for money from an increase in the real interest rate to keep the equation in balance.

R17 LM Curves

➤ The LM Curve

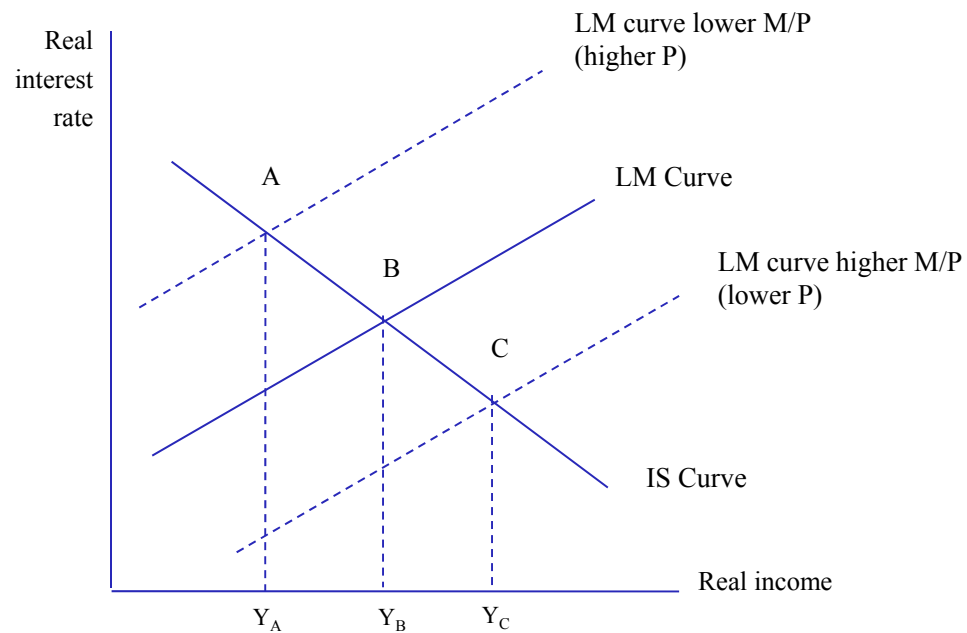


In equilibrium, there is a *positive relationship* between real income and the real interest rate for a given level of the real money supply.

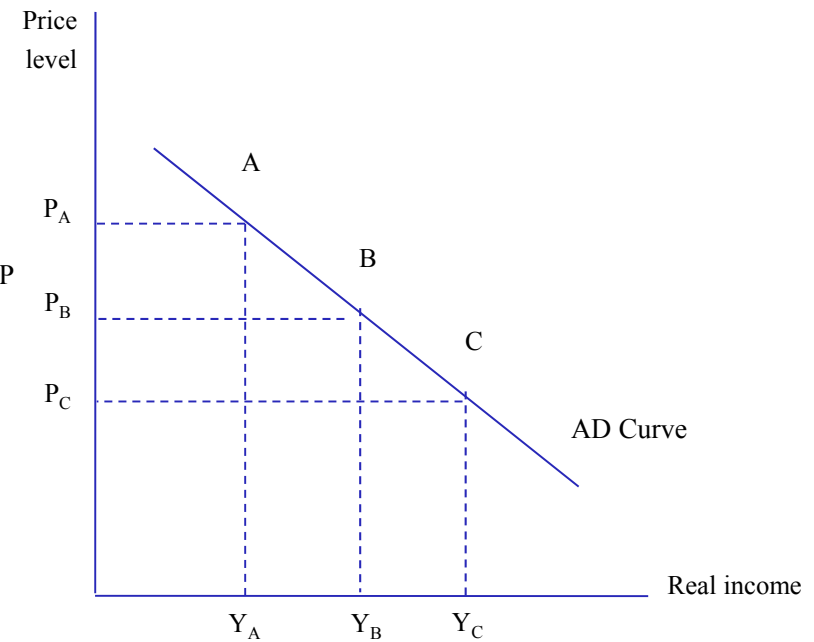
R17 Aggregate Demand Curve

➤ Deriving the Aggregate Demand Curve

(a) The IS and LM Curves



(b) The AD Curve



R17 Aggregate Demand Curve

- 假设一个经济中存在以下关系：
 - $y=c+i$ (收入恒等式, y 和 c 代表的实际水平)
 - $c=80+0.9y$ (消费)
 - $i=720-2000r$ (投资)
 - $Md/P=(0.2y-4000r)$ (货币需求)
 - 不存在政府支出和税收。货币供给在某年是500。
- 从产品市场均衡看,
 - $y=80+0.9y+720-2000r$
 - $0.1y=800-2000r$
 - $r=(800-0.1y)/2000$ IS曲线
- 从货币市场看,
 - $500/P=(0.2y-4000r)$
 - $r=(0.2y-500/P)/4000$ LM曲线

R17 Aggregate Demand Curve

➤ 将IS和LM方程联立得:

- $0.4y = 1600 + 500/P$

- $Y = 4000 + 1250/P$ AD曲线

- ✓ 如果 $P=1$, $y=5250$

- ✓ 如果 $P=1.25$, $y=5000$

- ✓ 如果 $P=1.3$, $y=4961$

- ✓ 如此等等, 说明均衡产出水平会随物价总水平变动而反方向变动。

R17 Aggregate Demand Curve

➤ 考虑一个三部门经济

- $C = a + b(Y - T)$ 其中 $T = T_0 + tY$ 则 $C = a + b(Y - T_0 - tY) = a + b(1 - t)Y - bT_0$

- $I = I_0 - dr$

➤ IS曲线: $Y = C + I + G = [a + b(1 - t)Y - bT_0] + [I_0 - dr] + G$

➤ 整理得出IS曲线:

$$Y = \frac{a + I_0 + G - bT_0}{1 - b(1 - t)} - \frac{dr}{1 - b(1 - t)}$$

➤ a:自主消费; b:边际消费倾向; t:边际税率; I_0 自主投资, 表示利率r为零时的投资量, d: 投资需求对利率变动的反应程度; G: 政府支出

R17 Aggregate Demand Curve

- 货币供给函数 $\frac{M}{P} = m$
- 货币需求函数 $L = L_1(y) + L_2(r) = ky - hr$
- LM曲线: $r = \frac{ky}{h} - \frac{M}{P} \times \frac{1}{h}$
 - $L_1(y)=ky$ 表示货币的交易与预防需求; $L_2(r)=-hr$ 表示货币的投机需求
 M 表示货币的名义供给; M/P 表示货币的实际供给
 - k :货币需求对于收入变动的敏感度; h :货币需求对于利率变动的敏感度
- IS-LM曲线联立得出三部门经济的AD曲线: 国民收入 Y 与物价水平 P 成反向变动关系
$$y = \frac{h(a + i_0 + g - bT_0)}{h[1 - b(1 - t)] + dk} + \frac{\frac{M}{h[1 - b(1 - t)] + k}}{\frac{d}{d}} \times \frac{1}{P}$$

R17 Aggregate Demand Curve

➤ 由IS曲线推导乘数

- 政府支出乘数（**government expenditure multiplier**）国民收入变化量与促成这种变化量的最初政府购买支出变化量的比例

$$K_G = \frac{1}{1-b(1-t)}$$

- 税收乘数（**tax multiplier**）

$$K_t = \frac{\Delta Y}{\Delta T} = \frac{-b}{1-b(1-t)}$$

- 政府转移支付乘数（**government transfer payment multiplier**）

$$K_{tr} = \frac{\Delta Y}{\Delta TR} = \frac{b}{1-b(1-t)}$$

- 平衡预算乘数（**The balance budget multiplier**）

$$K_b = \frac{\Delta Y}{\Delta G} = \frac{1-b}{1-b \times (1-t)}$$

R17 Aggregate Demand Curve

- When the IS and LM curves are combined, the point at which they intersect represents the levels of the real interest rate and income that are consistent with equilibrium between income and expenditure (points along the IS curve) and equilibrium between the real money supply and the real interest rate (points along the LM curve).
- The intersection between the IS and LM curves determines the equilibrium levels of prices and real income (real GDP) for a given level of the real money supply.
- The ***aggregate demand curve*** shows the relationship between the quantity of real output demanded (which equals real income) and the price level.
 - The relationship between the price level and real income, given that income is equal to planned expenditures (the IS curve) and money demand is equal to money supply (the LM curve), must be downward sloping.
 - The aggregate demand curve slopes downward because higher price levels reduce real wealth, increase real interest rates, and make domestically produced goods more expensive compared to goods produced abroad, all of which reduce the quantity of domestic output demanded.

R17 Slope of AD

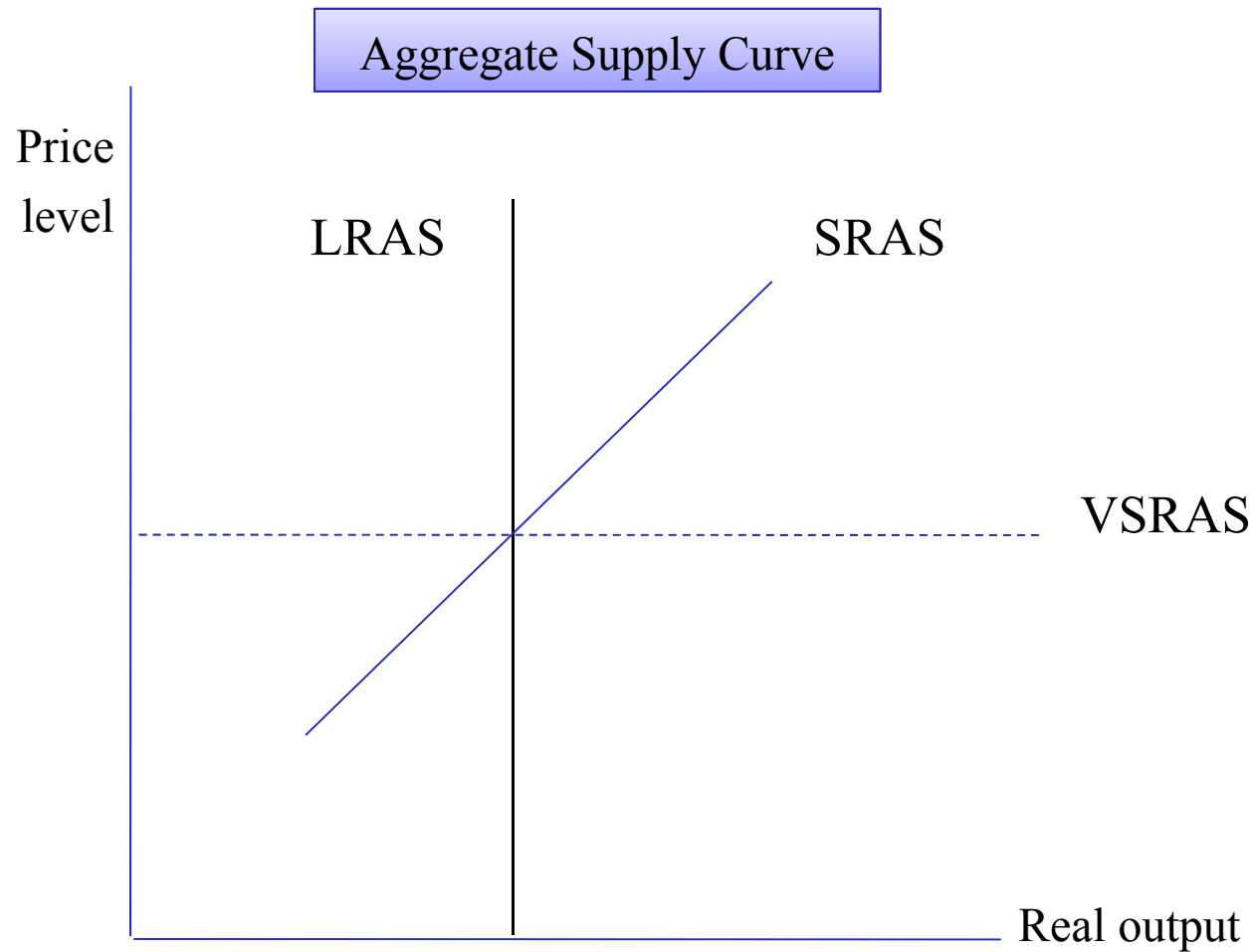
- For simplicity, we assume there are no changes in the fiscal or trade balances so that maintaining the balance between aggregate expenditure and aggregate income requires that changes in investment spending equal changes in private saving.
 - As the price level increases, the real money supply (M/P) declines.
 - To induce a corresponding decline in money demand, the interest rate must rise so that other assets are more attractive and income must fall to reduce the transactional need for money balances.
 - The higher interest rate induces companies to reduce investment spending. The decline in income reduces household saving.
- *The slope of the AD curve depends on the relative sensitivities of investment, saving; and money demand to income and the interest rate.* The AD curve will be flatter if
 - investment expenditure is highly sensitive to the interest rate;
 - saving is insensitive to income;
 - money demand is insensitive to interest rates; and
 - money demand is insensitive to income.
 - ✓ The first two conditions directly imply that income will have to move more to induce a large enough change in saving to match the change in investment spending.
 - ✓ All else equal, each of the last two conditions implies that a larger change in the interest rate is required to bring money demand in line with money supply. This, in turn, implies a larger change in investment spending and a correspondingly larger change in saving and incomes
- 注：由于货币供给等于货币需求，当价格上升时，实际货币需求应该减少，如果货币需求对于利率和Y不敏感，说明利率和Y变化很大，才能均衡；在产品市场上均衡， $I=S$ ，如果S对于Y不敏感，而I对于利率变化敏感，由于利率上升I减少得不多，S必须增加且Y必须很大变化，才能均衡，所以Y必须有很大的变化，最终AD曲线更加平坦的。从记忆的角度来说，AD曲线更加平坦，I对利率变化敏感，其他都不敏感。

R17 Aggregate Supply Curve

➤ Aggregate Supply Curve

- The **aggregate supply** (AS) curve describes the relationship between the price level and the quantity of real GDP supplied, when all other factors are kept constant. That is, it represents the amount of output that firms will produce at different price levels.
- We need to consider three aggregate supply curves with different time frames: the very short-run aggregate supply (VSRAS) curve, the short-run aggregate supply (SRAS) curve, and the long-run aggregate supply (LRAS) curve.
 - ✓ The VSRAS curve is perfectly elastic.
 - ✓ The LRAS curve is perfectly inelastic. In the long run, wages and other input prices change proportionally to the price level, so the price level has no long-run effect on aggregate supply. We refer to this level of output as potential GDP or full-employment GDP.
 - ✓ The SRAS curve is upward sloping.

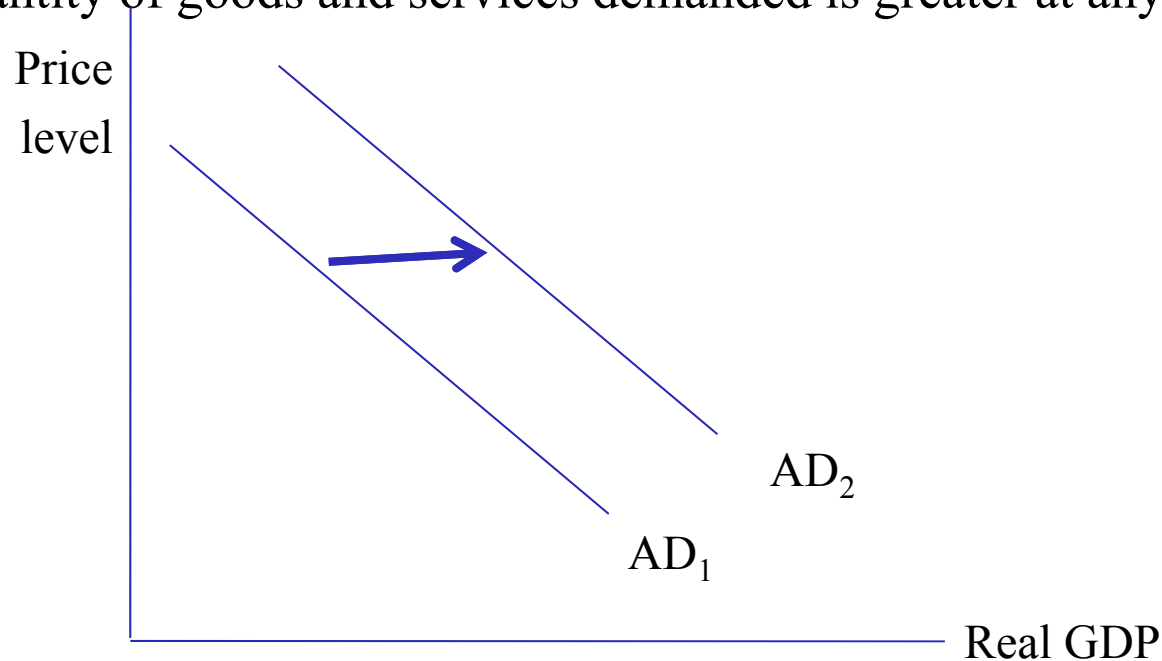
R17 Aggregate Supply Curve



R17 Shifts in the Aggregate Demand Curve

➤ Shifts in the Aggregate Demand Curve

- The aggregate demand (AD) curve reflects the total level of expenditures in an economy by consumers, businesses, governments, and foreigners. A number of factors can affect this level of expenditures and cause the AD curve to shift.
- Note that a change in the price level is represented as a movement along the AD curve, not a shift in the AD curve. See the following figure, an increase in aggregate demand is shown by a shift to the right, indicating that the quantity of goods and services demanded is greater at any given price level.



R17 Shifts in the Aggregate Demand Curve

- In trying to understand and remember the factors that affect aggregate demand, it may help to recall that, from the expenditure point of view, $GDP = C + I + G + NX$. For changes in each of the following factors that increase aggregate demand (shift AD to the right), we identify which component of expenditures is increased.
- **Increase in consumers' wealth:** As the value of households' wealth increases (real estate, stocks, and other financial securities), the proportion of income saved decreases and spending increases, increasing aggregate demand (C increases).
 - **Consumer expectations of future income:** When consumers expect higher future incomes, due to a belief in greater job stability or expectations of rising wage income, they save less for the future and increase spending now, increasing aggregate demand (C increases).
 - **Business expectations:** When businesses are more optimistic about future sales, they tend to increase their investment in plant, equipment, and inventory, which increases aggregate demand (I increases).
 - **High capacity utilization:** When companies produce at a high percentage of their capacity, they tend to invest in more plant and equipment, increasing aggregate demand (I increases).

R17 Shifts in the Aggregate Demand Curve

- **Expansionary monetary policy:** When the rate of growth of the money supply is increased, banks have more funds to lend, which puts downward pressure on interest rates. Lower interest rates increase both investment and consumers' spending. Thus, the effect of expansionary monetary policy is to increase aggregate demand (C and I increase).
 - ✓ Note that if the economy is operating at potential GDP (LRAS) when the monetary expansion takes place, the increase in real output will be only for the short run.
 - ✓ In the long run, subsequent increases in input prices decrease SRAS and return output to potential GDP.
- **Expansionary fiscal policy:** Expansionary fiscal policy refers to a decreasing government budget surplus (or an increasing budget deficit) from decreasing taxes, increasing government expenditures, or both.
 - ✓ A decrease in taxes increases disposable income and consumption, while an increase in government spending increases aggregate demand directly (C increases for tax cut, G increases for spending increase).

R17 Shifts in the Aggregate Demand Curve

- **Exchange rates:** A decrease in the relative value of a country's currency will increase exports and decrease imports. Both of these effects tend to increase domestic aggregate demand (net X increases).
- **Global economic growth:** GDP growth in foreign economies tends to increase the quantity of imports (domestic exports) foreigners demand. By increasing domestic export demand, this will increase aggregate demand (net X increases).

Note that for each factor, a change in the opposite direction will tend to decrease aggregate demand.

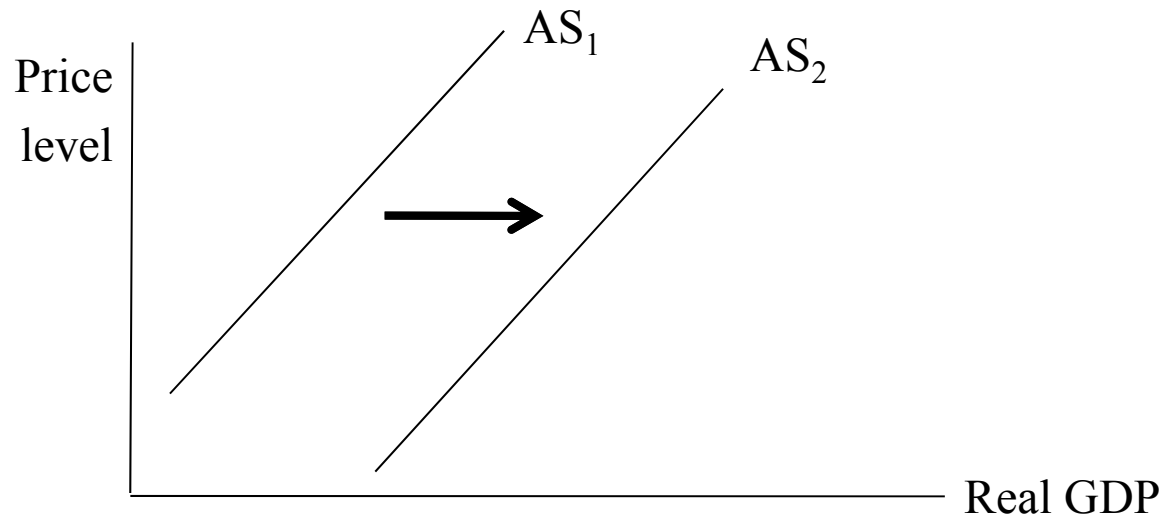
R17 Shifts in the Aggregate Demand Curve

Impact of Factors Shifting Aggregate Demand		
An Increase in the Following Factors	Shifts the AD Curve	Reason
Stock prices	Rightward: Increase in AD	Higher consumption
Housing prices	Rightward: Increase in AD	Higher consumption
Consumer confidence	Rightward: Increase in AD	Higher consumption
Business confidence	Rightward: Increase in AD	Higher investment
Capacity utilization	Rightward: Increase in AD	Higher investment
Government spending	Rightward: Increase in AD	Government spending a component of AD
Taxes	Leftward: Decrease in AD	Lower consumption and investment
Bank reserves	Rightward: Increase in AD	Lower interest rate, higher investment and possibly higher consumption
Exchange rate (foreign currency per unit domestic currency)	Leftward: Decrease in AD	Lower exports and higher imports
Global growth	Rightward: Increase in AD	Higher exports

R17 Shifts in the Short-Run Aggregate Supply Curve

➤ Shifts in the Short-Run Aggregate Supply Curve

- The short-run aggregate supply (SRAS) curve reflects the relationship between output and the price level when wages and other input prices are held constant (or are slow to adjust to higher output prices). The curve shows the total level of output that businesses are willing to supply at different price levels.
- A number of factors can affect this level of output and cause the SRAS curve to shift. See the following Figure, an increase in aggregate supply is shown by a shift to the right, as the quantity supplied at each price level increases.



R17 Shifts in the Short-Run Aggregate Supply Curve

- In addition to changes in potential GDP (shifts in long-run aggregate supply), a number of factors can cause the SRAS curve to shift to the right:
- **Labor productivity**: Holding the wage rate constant, an increase in labor productivity (output per hour worked) will decrease unit costs to producers. Producers will increase output as a result, increasing SRAS (shifting it to the right).
 - **Input prices**: A decrease in nominal wages or the prices of other important productive inputs will decrease production costs and cause firms to increase production, increasing SRAS. Wages are often the largest contributor to a producer's costs and have the greatest impact on SRAS.
 - **Taxes and government subsidies**: Either a decrease in business taxes or an increase in government subsidies for a product will decrease the costs of production. Firms will increase output as a result, increasing SRAS.
 - **Exchange rates**: Appreciation of a country's currency in the foreign exchange market will decrease the cost of imports. To the extent that productive inputs are purchased from foreign countries, the resulting decrease in production costs will cause firms to increase output, increasing SRAS.
 - **Expectations of future output prices**: When businesses expect the price of their output to increase in the future, they will expand production, increasing SRAS.

R17 Shifts in the Long-Run Aggregate Supply Curve

- The long-run aggregate supply (LRAS) curve is vertical (perfectly inelastic) at the potential (full-employment) level of real GDP. Changes in factors that affect the real output that an economy can produce at full employment will shift the LRAS curve.

Factors that will shift the LRAS curve are:

- **Increase in the supply and quality of labor:** Because LRAS reflects output at full employment, an increase in the labor force will increase full-employment output and the LRAS. An increase in the skills of the workforce, through training and education, will increase the productivity of a labor force of a given size, increasing potential real output and increasing LRAS.
- **Increase in the supply of natural resources:** Just as with an increase in the labor force, increases in the available amounts of other important productive inputs will increase potential real GDP and LRAS.
- **Increase in the stock of physical capital:** For a labor force of a given size, an increase in an economy's accumulated stock of capital equipment will increase potential output and LRAS.
- **Technology:** In general, improvements in technology increase labor productivity (output per unit of labor) and thereby increase the real output that can be produced from a given amount of productive inputs, increasing LRAS.

R17 Shifts in the Aggregate Supply Curve

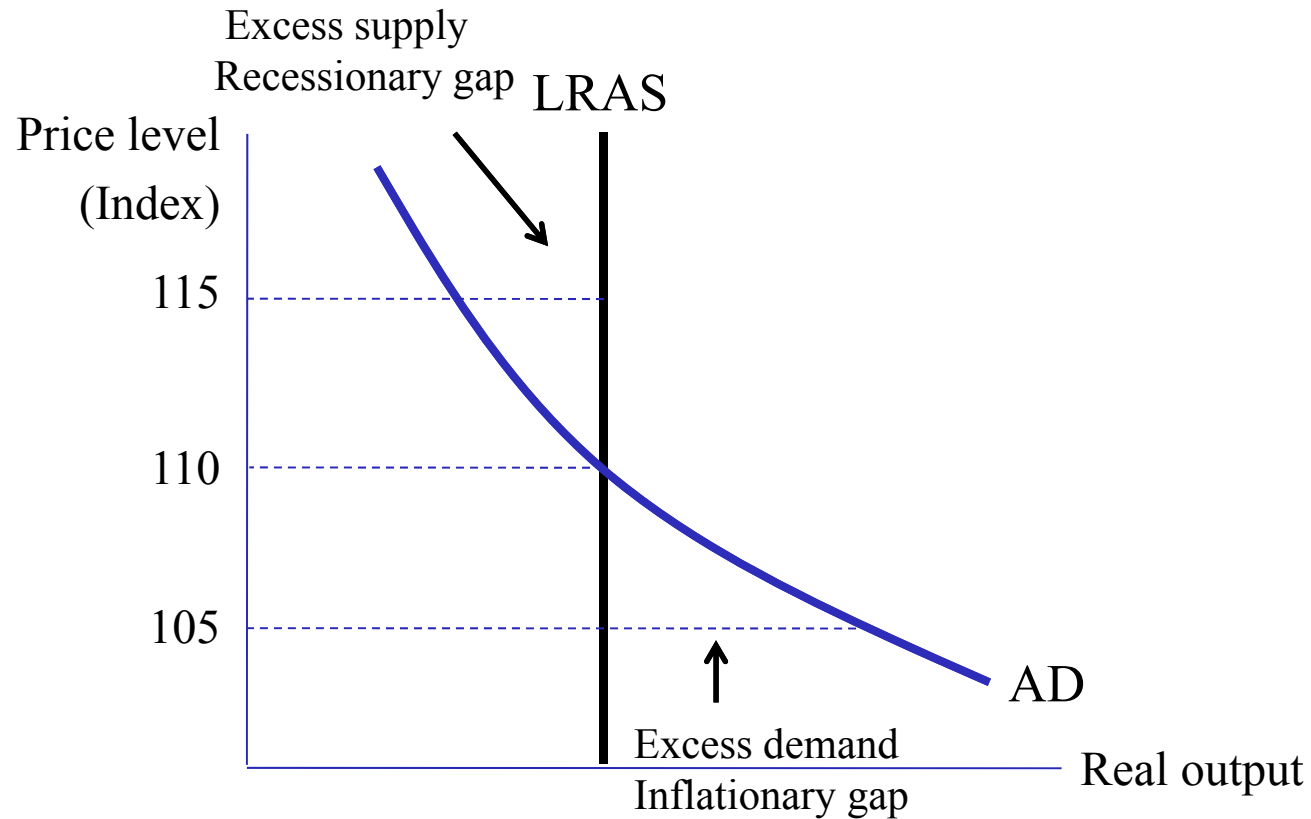
Impact of Factors Shifting Aggregate Supply			
An Increase in	Shifts SRAS	Shifts LRAS	Reason
Supply of labor	Rightward	Rightward	Increases resource base
Supply of natural resources	Rightward	Rightward	Increases resource base
Supply of human capital	Rightward	Rightward	Increases resource base
Supply of physical capital	Rightward	Rightward	Increases resource base
Productivity and technology	Rightward	Rightward	Improves efficiency of inputs
Nominal wages	Leftward	No impact	Increases labor cost
Input prices (e.g., energy)	Leftward	No impact	Increases cost of production
Expectation of future prices	Rightward	No impact	Anticipation of higher costs and/or perception of improved pricing power
Business taxes	Leftward	No impact	Increases cost of production
Subsidy	Rightward	No impact	Lowers cost of production
Exchange rate	Rightward	No impact	Lowers cost of production

R17 Movement along Aggregate Demand and Supply Curves

- Movement along aggregate demand and supply curves
 - In contrast with shifts in the aggregate demand and aggregate supply curves, movements along these curves reflect the impact of a change in the price level on the quantity demanded and the quantity supplied.
 - Changes in the price level alone do not cause shifts in the AD and AS curves, although changes in expected future prices can shift AD and AS curve.

R17 Long-Run Equilibrium Real Output

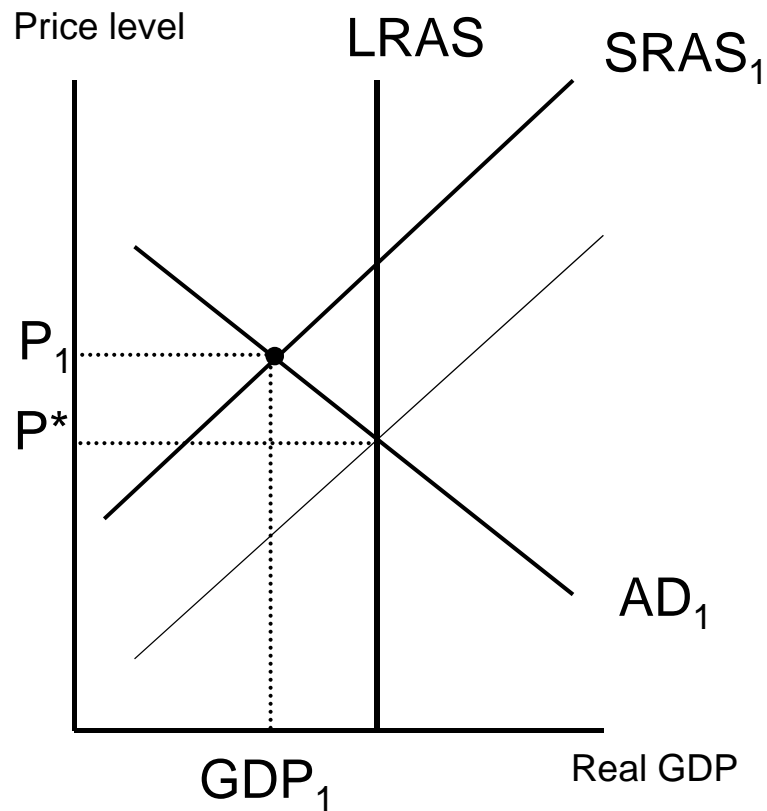
➤ Long-Run Equilibrium Real Output



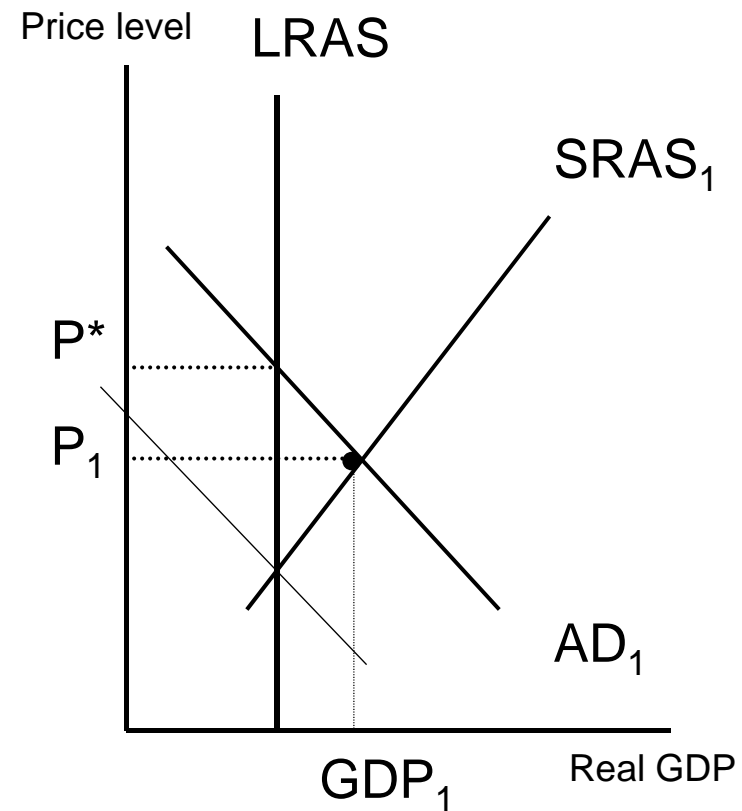
R17 Long-Run Disequilibrium

➤ Long-Run disequilibrium

(a) Below full employment

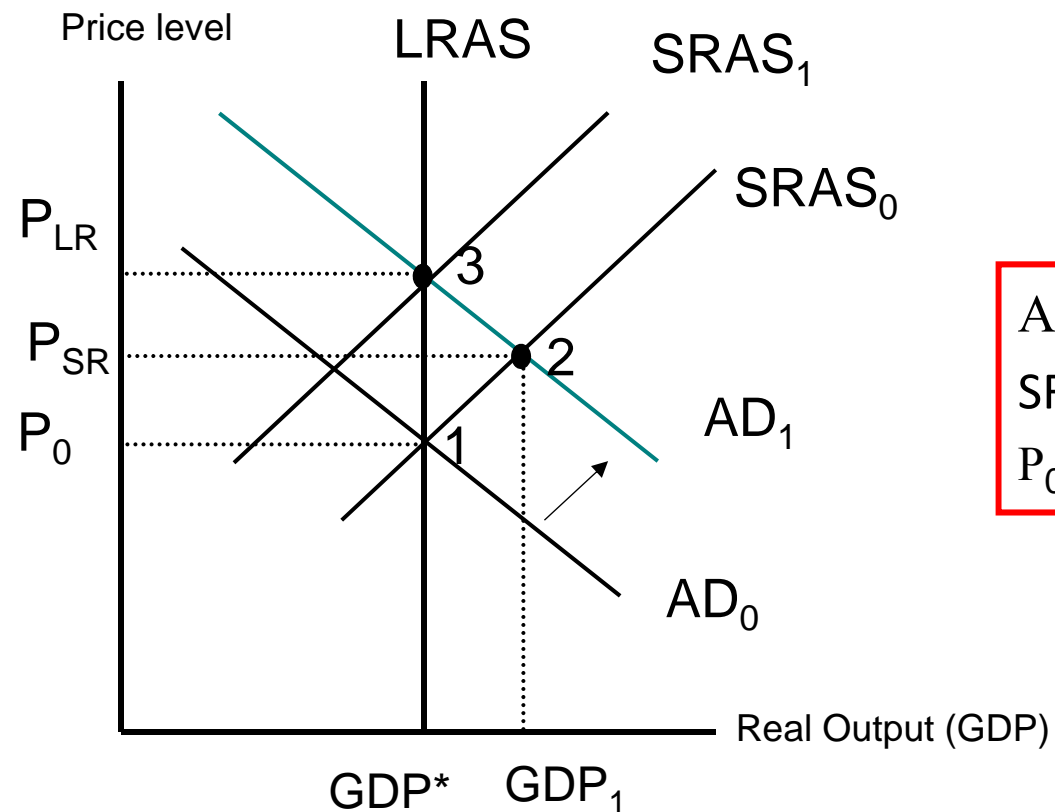


(b) above full employment



R17 Adjustment to an Increase in Aggregate Demand

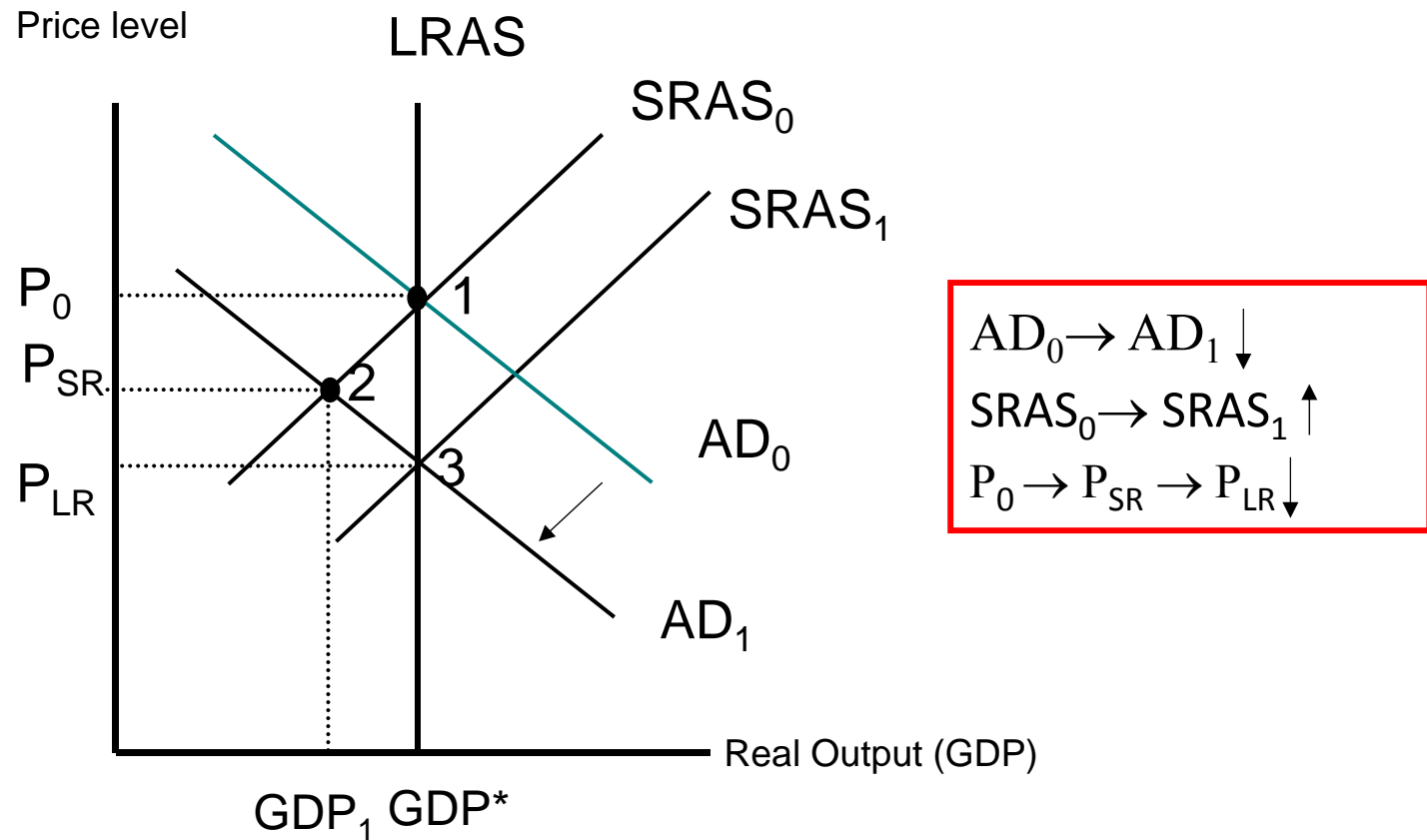
➤ Adjustment to an Increase in Aggregate Demand



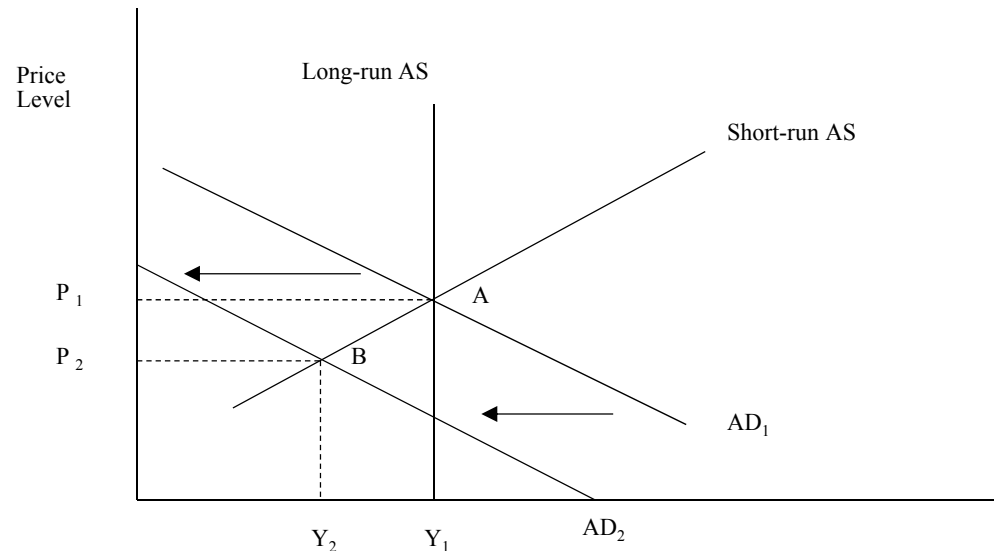
$AD_0 \rightarrow AD_1 \uparrow$
 $SRAS_0 \rightarrow SRAS_1 \downarrow$
 $P_0 \rightarrow P_{SR} \rightarrow P_{LR} \uparrow$

R17 Adjustment to a Decrease in Aggregate Demand

➤ Adjustment to a Decrease in Aggregate Demand



R17 Recessionary Gap



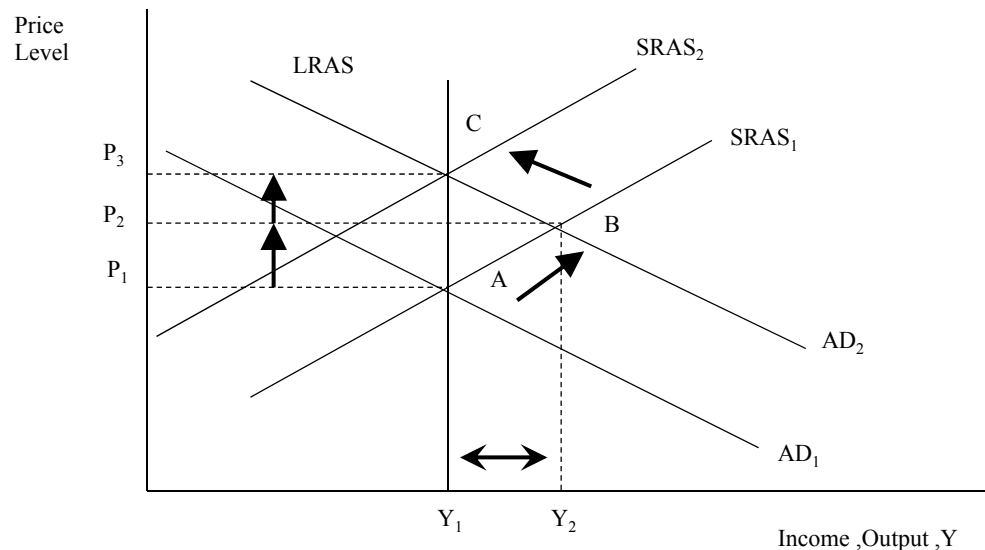
- **Investment Implications of a Decrease in AD** Aggregate demand and aggregate supply are theoretical measures that are very hard to measure directly. Most governments, however, publish statistics that provide an indication of the direction that aggregate demand and supply are moving over time.
- For example, statistics on consumer sentiment, factory orders for durable and nondurable goods, the value of unfilled orders, the number of new housing starts, the number of hours worked, and changes in inventories provide an indication of the direction of aggregate demand. If these statistics suggest that a recession is caused by a decline in AD, the following conditions are likely to occur:
 - Corporate profits will decline.
 - Commodity prices will decline.
 - Interest rates will decline.
 - Demand for credit will decline.

R17 Recessionary Gap

➤ **This suggests the following investment strategy:**

- Reduce investments in cyclical companies because their earnings are likely to decline the most in an economic slowdown.
- Reduce investments in commodities and/or commodity-oriented companies because the decline in commodity prices will slow revenue growth and reduce profit margins.
- Increase investments in defensive companies because they are likely to experience only modest earnings declines in an economic slowdown.
- Increase investments in investment-grade or government-issued fixed-income securities. The prices of these securities should increase as interest rates decline.
- Increase investments in long-maturity fixed-income securities because their prices will be more responsive to the decline in interest rates than the prices of shorter-maturity securities.
- Reduce investments in speculative equity securities and in fixed-income securities with low credit quality ratings.
- As with most investment strategies, this strategy will be most successful if it is implemented before other market participants recognize the Opportunities and asset prices adjust.

R17 Inflationary Gap



- **Investment Implications of an Increase in AD** resulting in an inflationary gap If economic statistics (consumer sentiment, factory orders for durable and nondurable goods, etc.) suggest that there is an expansion caused by an increase in AD, the following conditions are likely to occur:
- Corporate profits will rise.
 - Commodity prices will increase.
 - Interest rates will rise.
 - Inflationary pressures will build.

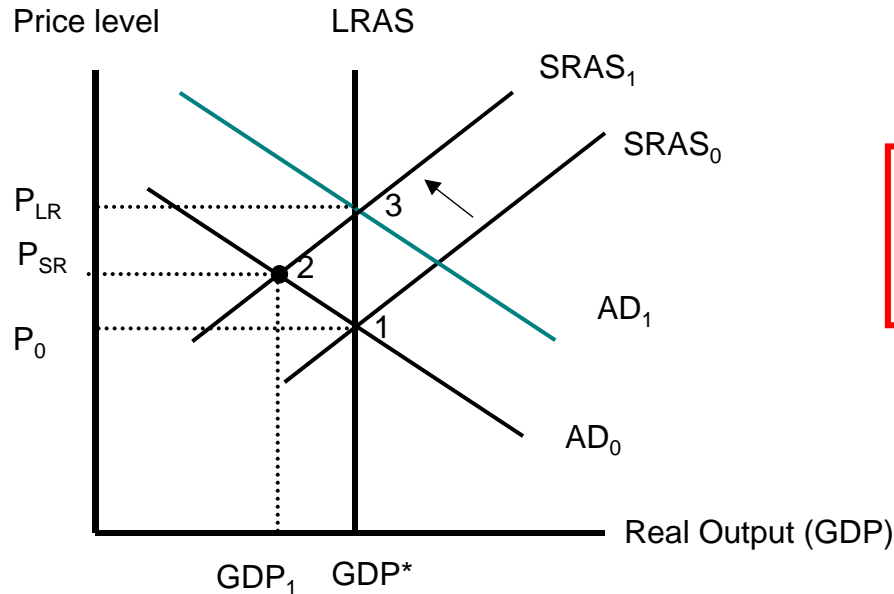
R17 Inflationary Gap

➤ **This suggests the following investment strategy:**

- Increase investment in cyclical companies because they are expected to have the largest increase in earnings.
- Reduce investments in defensive companies because they are expected to have only a modest increase in earnings.
- Increase investments in commodities and commodity-oriented equities because they will benefit from higher production and output.
- Reduce investments in fixed-income securities, especially longer-maturity securities, because they will decline in price as interest rates rise. Raise exposure to speculative fixed-income securities (junk bonds) because default risks decrease in an economic expansion.

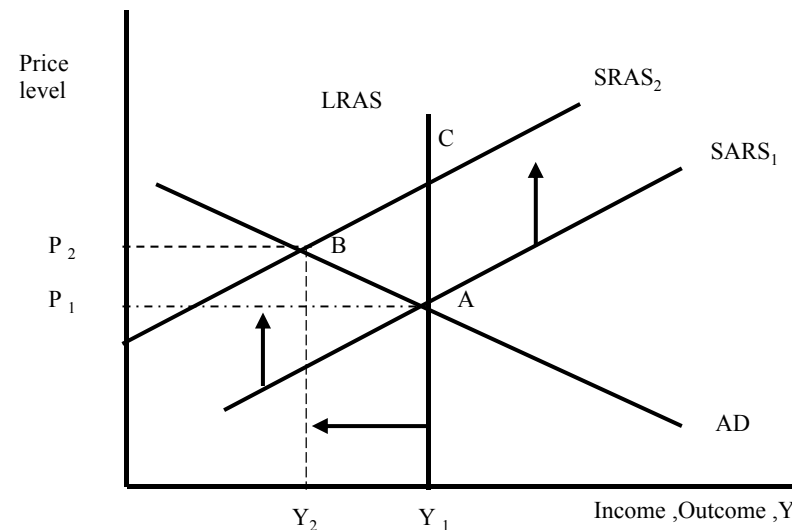
R17 Stagflation

- **Stagflation** refers to an environment of both high unemployment and increasing inflation. Stagflation is generally associated with a sharp decrease in aggregate supply.
- Stagflation is difficult for government policymakers to address because policy changes to reduce inflation tend to make unemployment worse, while policy changes to fight recession tend to make inflation worse.
 - If the government does not intervene, declines in wages and other input prices should return SRAS and real GDP to long-run equilibrium. However, this may be a slow process that makes it politically risky for the government to take no immediate action.



$SRAS_0 \rightarrow SRAS_1$
 $AD_0 \rightarrow AD_1$

R17 Stagflation



- **Investment implication of shift in AS:** labor and raw material costs, including energy prices, determine the direction of shifts in short-run aggregate supply.
- Higher costs for labor, raw materials, and energy lead to a decrease in aggregate supply. Lower labor costs, raw material prices, and energy prices lead to an increase in aggregate supply, resulting in higher economic growth and a lower aggregate price level. Productivity is also an important factor.
 - Higher rates of productivity growth shift the AS to the right, resulting in higher output and lower unit input prices. Lower rates of productivity growth do the opposite and shift the AS curve to the left.

R17 Stagflation

- From an investment perspective, a decline in AS (leftward shift of the SRAS curve) suggests:
- Reducing investment in fixed income because rising output price (i.e., inflation) put upward pressure on nominal interest rates;
 - Reducing investment in most equity securities because profit margins are squeezed and output declines;
 - Increasing investment in commodities or commodity-based companies because prices and profits are likely to rise.
 - On the other hand, an increase in AS (rightward shift of the SRAS curve) due to higher productivity growth or lower labor, raw material, and energy costs is favorable for most asset classes other than commodities.

R17 Effect of Combination of AS and AD

Change in AS	Change in AD	Effect on Real GDP	Effect on Aggregate Price Level
Increase	Increase	Increase	Indeterminate
Decrease	Decrease	Decrease	Indeterminate
Increase	Decrease	Indeterminate	Decrease
Decrease	Increase	Indeterminate	Increase

- Whether the growth of the economy is demand- or supply-driven has an impact on asset prices.
- Demand-driven expansions are normally associated with rising interest rates and inflation, whereas contractions are associated with lower inflation and interest rates.
 - Supply-driven expansions are associated with lower inflation and interest rates, whereas supply-driven contractions are associated with rising inflation and interest rates.

R17 Example: Investment Strategy Based on AD and AS Curves

➤ Example:

An analyst is evaluating the possibility of investing in China, Italy, Mexico, or Brazil. What are the equity and fixed-income investment opportunities in these countries based on the following events?

1. The Chinese government announced a spending plan of \$1.2 trillion or 13 percent of GDP. In addition, the central bank of China eased monetary policy, resulting in a surge of lending.
2. The Italian government announced a decline in labor productivity, and it expects this trend to continue into the future.
3. In response to rising inflationary pressure, the Mexican central bank tightened monetary policy, and the government announced tax increases and spending cuts to balance the budget.
4. A major discovery of oil off the coast of Brazil lowered oil prices, while the Brazilian government announced a major increase in spending on public infrastructure to stimulate the economy.

R17 Example: Investment Strategy Based on AD and AS Curves

- **Solution to 1:** Simulative fiscal and monetary policies should result in a demand-driven expansion. Investors should reduce investments in fixed-income securities and defensive companies and invest in cyclical companies and commodities. As a result, the prospects for growth-oriented equity investments look favorable in China.
- **Solution to 2:** A decline in labor productivity will result in a decline in AS; i.e., the AS curve will shift to the left. This is typically a poor investment environment. Investors should reduce investments in both fixed-income and equity securities and invest in commodities. Entry into Italian stocks and bonds does not look attractive.
- **Solution to 3:** The policy measures put in place by the Mexican government and central bank will cause a drop in AD and likely result in a recession. Investors should increase their investments in fixed-income securities because interest rates will most likely decline as the recession deepens. This is a poor environment for equity securities.
- **Solution to 4:** This is a situation where both the AD and AS curves will shift. The increase in spending on public infrastructure will shift the AD curve to the right, resulting in higher aggregate expenditures and prices. Lower oil prices will shift the AS curve to the right, resulting in higher GDP but lower prices. Thus, GDP will clearly increase, but the impact on prices and inflation is indeterminate. As a result, investors should increase their investment in equity securities; however, the impact on fixed-income securities is unclear.

R17 Sources of Economic Growth

- Economic growth can best be explained by examining five important sources of economic growth:
- **Labor supply**. The labor force is the number of people over the age of 16 who are either working or available for work but currently unemployed. It is affected by population growth, net immigration, and the labor force participation rate. Growth of the labor force is an important source of economic growth.
 - **Human capital**. The education and skill level of a country's labor force can be just as important a determinant of economic output as the size of the labor force. Because workers who are skilled and well-educated (possess more human capital) are more productive and better able to take advantage of advances in technology, investment in human capital leads to greater economic growth.

R17 Sources of Economic Growth

- **Physical capital stock.** A high rate of investment increases a country's stock of physical capital. A larger capital stock increases labor productivity and potential GDP. An increased rate of investment in physical capital can increase economic growth.
- **Technology.** Improvements in technology increase productivity and potential GDP. More rapid improvements in technology lead to greater rates of economic growth.
- **Natural resources.** Raw material inputs, such as oil and land, are necessary to produce economic output. These resources may be *renewable* (e.g., forests) or *nonrenewable* (e.g., coal). Countries with large amounts of productive natural resources can achieve greater rates of economic growth.

R17 Sustainability of Economic Growth

- One way to view potential GDP is with the following equation:
 - Potential GDP = aggregate hours worked \times labor productivity
 - Or stated in terms of economic growth:
$$\text{growth in potential GDP} = \text{growth in labor force} + \text{growth in labor productivity}$$
- An economy's sustainable growth rate can be estimated by estimating the growth rate of labor productivity and the growth rate of the labor force.
- The sustainable rate of economic growth is important because long-term equity returns are highly dependent on economic growth over time. A country's sustainable rate of economic growth is the rate of increase in the economy's productive capacity (potential GDP).

R17 Production Function

- A **production function** describes the relationship between output and labor, the capital stock, and productivity.
 - Economic output can be thought of as a function of the amounts of labor and capital that are available and their productivity, which depends on the level of technology available. That is:

$$Y = A \times f(L, K)$$

where:

Y = aggregate economic output ;

L = size of labor force;

K = amount of capital available ;

A = total factor productivity

- **Total factor productivity** is a multiplier that quantifies the amount of output growth that cannot be explained by the increases in labor and capital.

R17 Production Function

- The production function can be stated on a per-worker basis by dividing by L :

$$Y/L = A \times f(K/L)$$

where:

Y/L = output per worker (labor productivity)

K/L = physical capital per worker

- This relationship suggests that labor productivity can be increased by either improving technology or increasing physical capital per worker.
- We assume that the production function exhibits diminishing marginal productivity for each individual input, meaning the amount of additional output produced by each additional unit of input declines (holding the quantities of other inputs constant).
- For this reason, sustainable long-term growth cannot necessarily be achieved simply by capital deepening investment – that is to say, increasing physical capital per worker over time.
- Productivity gains and growth of the labor force are also necessary for long-term sustainable growth.

R17 Growth and Growth of Total Factor Productivity

- A well-known model of the contributions of technology, labor, and capital to economic growth is:

growth in potential GDP =

growth in technology + W_L (growth in labor) + W_C (growth in capital)

where W_L and W_C are labor's percentage share of national income and capital's percentage share of national income.

- Growth in total factor productivity is driven by improvements in technology. Sometimes, the relationship between potential GDP, technology improvements, and capital growth is written on a per-capita basis as:

growth in per-capita potential GDP =

growth in technology + W_C (growth in the capital-to-labor ratio)

Framework of Economics

➤ SS 4 Microeconomic Analysis

- R13 demand and supply: introduction
- R14 demand and supply: consumer demand introduction
- R15 demand and supply: the firm
- R16 the firm and the market structure

➤ SS 5 Macroeconomic Analysis

- R17 aggregate output, price, and economic growth
- R18 understand business cycles
- R19 monetary and fiscal Policy

➤ SS 6 Economics in a Global Context

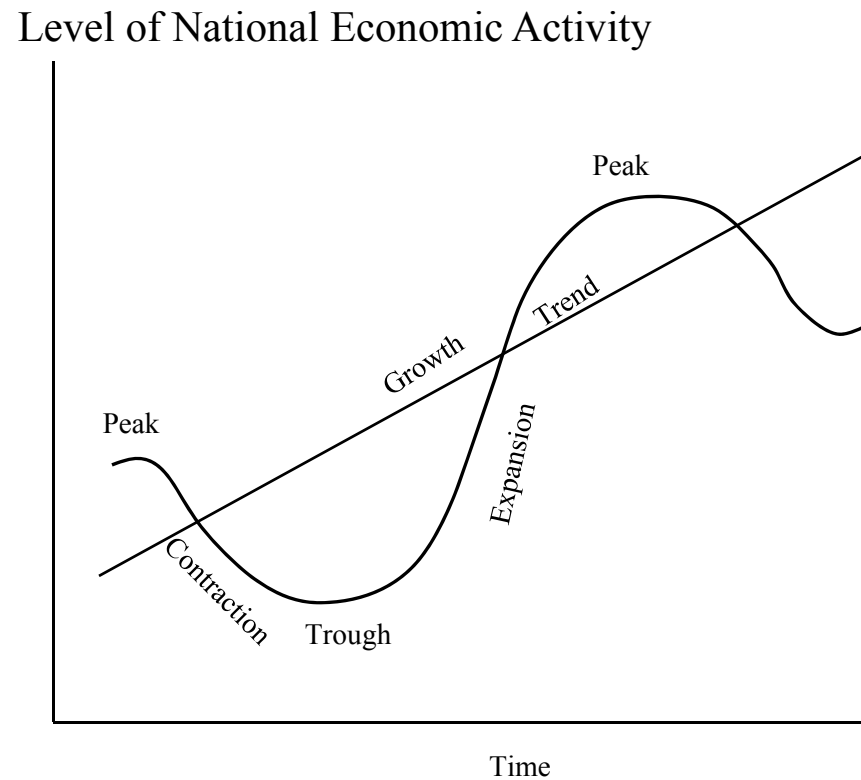
- R20 international trade and capital flow
- R21 currency exchange rate

R18 Business cycles

- Business cycles
- Theories of business cycles
- Unemployment
- Inflation
- Economic indicators

R18 Business cycles

- **Business cycle** is characterized by fluctuations in economic activity.
 - Real gross domestic product (GDP) and the rate of unemployment are the key variables used to determine the current phase of cycle.
- Business cycle has four phases: trough \ expansion \ peak \ contraction



R18 Business cycles

- A common rule of thumb is to consider two consecutive quarters of growth in real GDP as the beginning of an expansion and two consecutive quarters of declining real GDP as indicating the beginning of a contraction.
- Statistical agencies that date expansions and recessions, look at a wider variety of economic data such as employment, industrial production, and real personal income to identify turning points in the business cycle.
- The idea of a business cycle applies to economies that consist mainly of businesses. For economies that are mostly subsistence agriculture or dominated by state planning, fluctuations in activity are not really "business cycles" in the sense we are discussing here.

R18 Example: When Do Recessions Begin and End?

➤ **Example:**

1. Which of the following rules is most commonly used to determine when recessions start? Recessions start when:

- A. the central bank runs out of foreign reserves.
- B. real GDP has two consecutive quarters of negative growth.
- C. economic activity experiences a material decline in two business sectors.

2. Suppose you are interested in forecasting earnings growth for a company active in a country where no official business cycle dating committee (such as the NBER) exists. Which variables would you consider to estimate peaks and troughs of that country's business cycles, in addition to any existing index of leading indicators?

- A. Inflation, the central bank's discount rate, and unemployment.
- B. The DJIA, equity market average book value, and monetary base.
- C. Unemployment, GDP growth, industrial production, and inflation.

➤ **Solution:**

Solution to 1: B is correct. GDP is the measure for the whole economy, whereas foreign reserves or a limited number of sectors may not have material impact on the whole economy.

Solution to 2: C is correct. The discount rate, the monetary base, and stock market indices are not direct measures of economic activities. The first two are determined by monetary policy, which react to economic activities, whereas the stock market indices tend to be forward looking.

R18 Resource use fluctuation

- Inventories are an important business cycle indicator. Firms try to keep enough inventory on hand to meet sales demand but do not want to keep too much of their capital tied up in inventory. As a result, the ratio of inventory to sales in many industries tends toward a normal level in times of steady economic growth.
- When an expansion is approaching its peak, sales growth begins to slow, and unsold inventories accumulate. This can be seen in an increase in the inventory-sales ratio above its normal level.
 - Firms respond to an unplanned increase in inventory by reducing production.
- The opposite occurs when a contraction reaches its trough. Having reduced their production levels to adjust for lower sales demand, firms find their inventories becoming depleted more quickly once sales growth begins to accelerate.
 - This causes the inventory-sales ratio to decrease below its normal level.
 - To meet the increase in demand, firms will increase output, and the inventory-sales ratio will increase toward normal levels.

R18 Resource use fluctuation

- One of the ways firms react to fluctuations in business activity is by adjusting their utilization of labor and physical capital.
 - Utilization of labor levels:
 - ✓ Adding and subtracting workers in lockstep with changes in economic growth would be costly for firms, in terms of both direct expenses and the damage it would do to employee morale and loyalty.
 - ✓ Firms typically begin by changing how they utilize their current workers, producing less or more output per hour or adjusting the hours they work by adding or removing overtime.
 - ✓ Only when an expansion or contraction appears likely to persist will they hire or lay off worker.
 - Utilization of physical capital levels:
 - ✓ During contractions, however, firms will not necessarily sell plant and equipment outright. They can reduce their physical capacity by spending less on maintenance or by delaying the replacement of equipment that is near the end of its useful life.

R18 Housing Sector activity

- Cyclical swings in activity in the housing market can be large so that the effect on overall economic activity is greater than it otherwise would be.
- Important determinants of the level of economic activity in the housing sector:
 - **Mortgage rates:** Low (high) interest rates tend to increase (reduce) home buying and construction
 - **Housing costs relative to income:** Housing activity can decrease even when incomes are rising late in a cycle if home prices are rising faster than incomes, leading to decreases in purchase and construction activity
 - **Speculative activity:** Higher prices led to more construction and eventually excess building, resulting in falling prices that decreased or eliminated speculative demand and led to dramatic decreases in housing activity overall.
 - **Demographic factors:** The proportion of the population in the 25- to 40-year-old segment is positively related to activity in the housing sector

R18 External trade sector activity

- The most important factors determining the level of a country's imports and exports are:
 - domestic GDP growth → imports
 - GDP growth of trading partners → exports
 - currency exchange rates → imports and exports
 - ✓ Currency effects can differ in direction from GDP growth effects and change in response to a complex set of variables. The effects of changes in GDP levels and growth rates are more direct and immediate
- Typical business cycle characteristics:
 - **Trough:**
 - ✓ GDP growth rate changes from negative to positive
 - ✓ High unemployment rate, increasing use of overtime and temporary workers.
 - ✓ Spending on consumer durable goods and housing may increase
 - ✓ Moderate or decreasing inflation rate

R18 Business cycle characteristics

- **Expansion:**

- ✓ GDP growth rate increases
- ✓ Unemployment rate decreases as hiring accelerates
- ✓ Investment increases in producers' equipment and home construction
- ✓ Inflation rate may increase.
- ✓ Imports increase as domestic income growth accelerates

- **Peak**

- ✓ GDP growth rate decreases.
- ✓ Unemployment rate decreases but hiring slows
- ✓ Consumer spending and business investment grow at slower rates
- ✓ Inflation rate increases.

- **Contraction/recession**

- ✓ GDP growth rate is negative
- ✓ Hours worked decrease, unemployment rate increases
- ✓ Consumer spending, home construction, and business investment decrease
- ✓ Inflation rate decreases with a lag.
- ✓ Imports decrease as domestic income growth slows

R18 Characteristics of Different Business Cycle Phase

	Early Expansion (Recovery)	Late Expansion	Peak	Contraction (Recession)
Economic Activity	►Gross domestic (GDP), Industrial production, and other measures of economic activity turn from decline to expansion.	►Activity measures show an accelerating rate of growth.	►Activity measures show decelerating rate of growth.	►Activity measures show outright declines.
Employment	►Layoff slow (and net Employment turns positive), but new hiring does not yet occur and the unemployment rate remains high. At first, business turns to overtime and temporary employees to meet rising product demands.	►Business begins full time Rehiring as Overtime hours rise. The unemployment rate falls to low levels.	►Business slows its rate of hiring; however, the unemployment rate continues to Fall	►Business first cuts hours and freezes hiring, followed by outright layoffs. The unemployment rate rises.
Consumer and Business Spending	►Upturn often most Pronounced in housing, durable consumer items, and orders for light producer equipment.	►Upturn becomes more broad-based. Business begins to order heavy equipment and engage in construction.	►Capital spending expands rapidly, but the growth rate of spending starts to slow down.	►Cutbacks appears most in industrial production, housing, consumer durable items and orders for new business equipment, followed, with a lag, by cutbacks in other forms of capital spending.
Inflation	►Inflation remains moderate and may continue to fall	►Inflation picks up modestly.	►Inflation further accelerates	►Inflation decelerates but with a lag.

R18 Theories of the Business Cycle

➤ Neoclassical school

- Believe shifts in both aggregate demand and aggregate supply are primarily driven by changes in technology over time.
- Believe that the economy has a strong tendency toward full-employment equilibrium, as recession puts downward pressure on the money wage rate, or over-full employment puts upward pressure on the money wage rate.
- Conclude that business cycles are temporary deviations from long-run equilibrium.

➤ Keynesian school

- Believe that shifts in aggregate demand due to changes in expectations were the primary cause of business cycles.
- Believe these fluctuations are primarily due to swings in the level of optimism of those who run business.
 - ✓ They overinvest and overproduce when they are too optimistic about future growth in potential GDP.
 - ✓ They underinvest and underproduce when they are too pessimistic or fearful about the future growth in potential GDP
- Argue that wages are “downward sticky”, reducing the ability of a decrease in money wages to increase short-run aggregate supply and move the economy from recession (or depression) back toward full employment.
- The policy prescription of Keynesian economists is to directly increase aggregate demand through monetary policy or through fiscal policy.

R18 Theories of the Business Cycle

➤ New Keynesian school

- Added the assertion that the prices of productive inputs other than labor are also “downward sticky,” presenting additional barriers to the restoration of full-employment equilibrium.

➤ Monetarist school

- Believe the variations in aggregate demand that cause business cycles are due to variations in the rate of growth of the money supply, likely from inappropriate decisions by the monetary authorities.
- Believe that recessions can be caused by external shocks or by inappropriate decreases in the money supply.
- Suggest that to keep aggregate demand stable and growing, the central bank should follow a policy of steady and predictable increases in the money supply.

R18 Theories of the Business Cycle

➤ Austrian school

- Believe business cycles are caused by government intervention in the economy.
- When policymakers force interest rates down to artificially low levels, firms invest too much capital in long-term and speculative lines of production, compared to actual consumer demand.
- When these investments turn out poorly, firms must decrease output in those lines, which causes a contraction.

➤ New Classical school introduced real business cycle theory (RBC).

- Emphasizes the effect of real economic variables such as changes in technology and external shocks, as opposed to monetary variables, as the cause of business cycles.
- Applies utility theory to macroeconomics. Based on a model in which individuals and firms maximize expected utility, New Classical economists argue that policymakers should not try to counteract business cycles because expansions and contractions are efficient market responses to real external shock.

R18 Key Terms in the Labor Market

- **Employed**: number of people with a job.
 - This figure normally does not include people working in the informal sector (e.g., unlicensed cab drivers, illegal workers, etc.)
- **Labor force**: number of people who either have a job or are actively looking for a job.
 - This number *excludes* retirees, children, stay-at-home parents, fulltime students, and other categories of people who are neither employed nor actively seeking employment.
- **Unemployed**: people who are actively seeking employment but are currently without a job.
 - **Long-term unemployed**: people who have been out of work for a long time (more than 3-4 months in many countries) but are still looking for a job.
 - **Frictionally unemployed**: people who are not working at the time of filling out the statistical survey because they just left one job and are about to start another job.

R18 Key Terms in the Labor Market

- Unemployment rate is the percentage of people in the labor force who are unemployed.

$$\text{unemployment rate} = \frac{\text{number of unemployed}}{\text{labor force}} \times 100$$

- Unemployment rate is a lagging economic indicator of the business cycle.
 - ✓ The unemployment rate tends to point to a past economic condition – that is, it lags the cycle – because the labor force expands and declines in response to the economic environment.
 - ✓ The unemployment indicator tends to lag the cycle comes from the typical reluctance of businesses to lay off people.
 - ✓ The effect can also be seen in data on productivity, or output per hour worked.
 - ◆ Productivity declines early in contractions as firms try to keep employees on despite producing less output.
 - ◆ Productivity increases early in expansions as firms try to produce more output but are not yet ready to hire new workers.

R18 Key Terms in the Labor Market

- **Participation ratio** (also referred to as the activity ratio or labor force participation rate) is the percentage of the working-age population who are either employed or actively seeking employment

$$\text{labor force participation rate} = \frac{\text{labor force}}{\text{Working - age population}} \times 100$$

- **Underemployed**: person who has a job but has the qualifications to work a significantly higher-paying job.
- **Discouraged worker**: person who has stopped looking for a job. When economy returns to be good, the unemployment rate will increase because the discouraged workers enter the labor force and has not found the job.
- **Voluntarily unemployed**: person voluntarily outside the labor force.
- such as a jobless worker refusing an available vacancy for which the wage is lower than their threshold or those who retired early.

R18 Example: Unemployment

➤ **Example:**

1. Comparisons of unemployment among countries:
 - A. are impossible.
 - B. show which countries are more prosperous.
 - C. must take into account different unemployment measurement methods.
2. Unemployment frequently lags the cycle because:
 - A. it takes time to compile the employment data
 - B. businesses are reluctant to dismiss and hire workers.
 - C. workers must give notice to employers before quitting jobs.
3. Productivity offers perspective on the business cycle by:
 - A. showing the need for new employees.
 - B. assessing the skill set of existing employees.
 - C. measuring the intensity of work flow for existing employees.

➤ **Solution:**

Solution to 1: C is correct. Different countries use different statistical scope and ratio definitions, and these differences have to be reconciled before meaningful conclusions can be made from cross-country comparisons.

Solution to 2: B is correct. Besides labor hoarding by employers because of the costs related to hiring-and firing, the variations of labor force over business cycles also contribute to this feature of the unemployment rate.

Solution to 3: C is correct. Because employers would like to keep the workforce relatively stable, productivity falls as output declines in a downturn because it is measured as the ratio of output over hours worked. Similarly productivity rises as output recovers.

R18 Inflation, Deflation and Disinflation

- **Inflation** is a persistent increase in the price level over time.
 - If inflation is present, the prices of almost all goods and services are increasing.
 - **Inflation rate** is the percentage increase in the price level, typically compared to the prior year.
 - **Hyperinflation**: an extremely fast increase in aggregate price level, which corresponds to an extremely high inflation rate.
- **Deflation**: a sustained decrease in aggregate price level, which corresponds to a negative inflation rate.
- **Disinflation**: a decline in the inflation rate.
 - Disinflation is very different from deflation because even after a period of disinflation, the inflation rate remains positive and the aggregate price level keeps rising (although at a slower speed).

R18 Inflation Measurement - CPI

➤ The consumer price index (CPI)

- CPI is the best known indicator of U.S. inflation. The CPI measures the average price for a defined “basket” of goods and services that represents the purchasing patterns of a typical *urban household*.

$$\text{CPI} = \frac{\text{cost of basket at current prices}}{\text{cost of basket at base period prices}} \times 100$$

- Analysts who compare price indexes for different countries should be aware of differences in their composition.
- The weights assigned to each good and service reflect the typical consumer's purchasing patterns, which are likely to be significantly different across countries and regions.
- There can be differences in how the data are collected.

R18 Other Inflation Measurements

➤ Other inflation measurements:

- **Price index for personal consumption expenditures**
- **GDP deflator**
- **Producer price index (PPI): reflect future CPI**
 - ✓ Reflect the price changes experienced by domestic producers in a country.
 - ✓ Include: fuels, farm products (such as grains and meat), machinery and equipment, chemical products (such as drugs and paints), transportation equipment, metals, pulp and paper, and so on.
- **Wholesale price index (WPI)**
 - ✓ In some countries, the PPI is called the WPI.
- For both consumer and producer prices, analysts and policymaker often distinguish between headline inflation and core inflation.
 - ✓ **Headline inflation** refers to price indexes for all goods.
 - ✓ **Core inflation** refers to price indexes that exclude food and energy. Thus, core inflation can sometimes be a more useful measure of the underlying trend in prices.

R18 Laspeyres Index

- **Laspeyres index:** uses a constant basket of goods and services. Most countries calculate consumer price inflation this way.
- Three factors cause a Laspeyres index of consumer prices to be biased upward as a measure of the cost of living:
 - ***New goods.*** Older products are often replaced by newer, but initially more expensive, products. New goods are periodically added to the market basket, and the older goods they replace are reduced in weight in the index. This biases the index upward.
 - ***Quality changes.*** If the price of a product increases because the product has improved, the price increase is not due to inflation but still increases the price index.
 - ***Substitution.*** Even in an inflation-free economy, prices of goods relative to each other change all the time. When two goods are substitutes for each other, consumers increase their purchases of the relatively cheaper good and buy less of the relatively more expensive good. Over time, such changes can make a Laspeyres index's fixed basket of goods a less accurate measure of typical household spending.

R18 Hedonic Pricing, Fisher Index, and Paasche Index

➤ Solution for Laspeyres index biases:

- Many countries adjust for the quality of the products in a basket, a practice called *hedonic pricing*.
- New products can be introduced into the basket over time.
- The substitution bias can be somewhat resolved by using chained price index formula.
 - ✓ One such example is the *Fisher index*, which is the geometric mean of the Laspeyres index and the Paasche index.
- *Paasche index* is an index formula using the current composition of the basket.

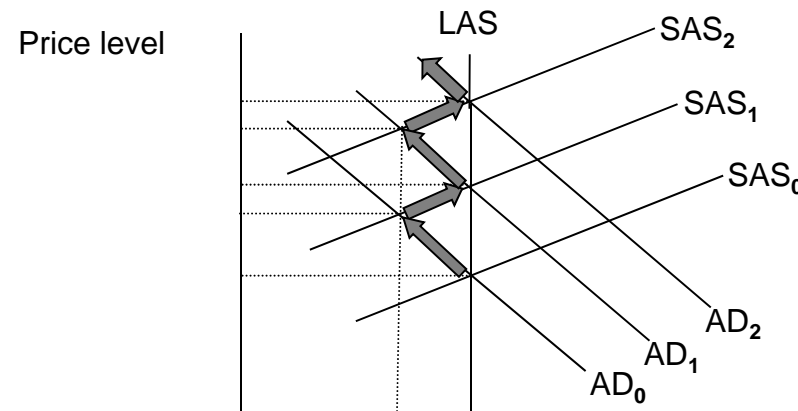
R18 Cost-push inflation

- When studying cost-push, or wage-push, inflation, we focus
 - On the commodity prices because commodities are an input to production.
 - Most particularly on the labor market because wages are the single biggest cost to businesses.
- In order to *measure demand relative to capacity*, the key is
 - the unemployment rate
 - ✓ Labor participation rate: more accurate for practitioners
 - as well as measures of the number of workers available to meet the economy's expanding needs.

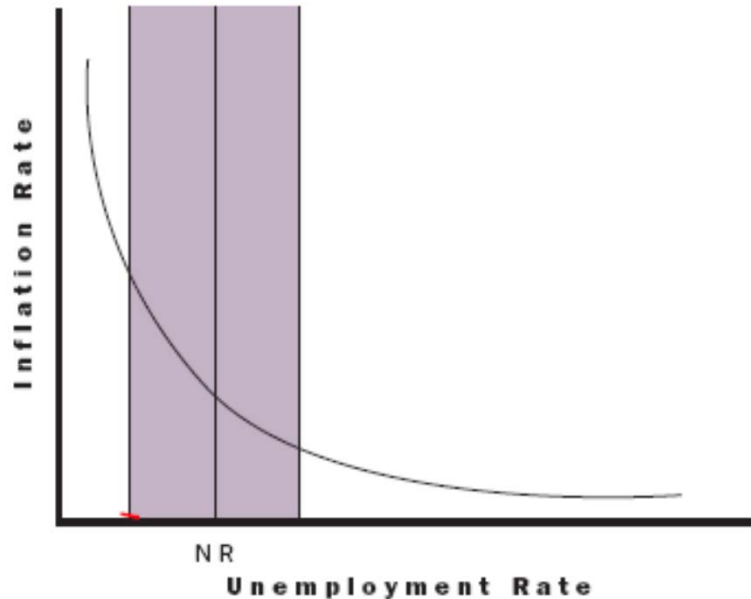
R18 Cost-Push Inflation

- An inflation that results from an initial increase in costs is called **cost-push inflation**. The two main sources of increases in costs are
 - An increase in money wage rates
 - An increase in the money prices of raw materials
- Steps in cost-push inflation:
 - Step1: money wage rate & money prices of raw materials $\uparrow \rightarrow$ SAS左移 ($SAS_0 \rightarrow SAS_1$) \rightarrow stagflation (the price level increases and the economy experiences inflation)
 - Step2: the Fed increases the quantity of money \rightarrow AD右移 ($AD_0 \rightarrow AD_1$)
 - Step3: the price of goods $\uparrow \rightarrow$ the price of material $\uparrow \rightarrow$ stagflation $\rightarrow \dots$ (价格持续上涨)

A Cost-push Inflation Spiral



R18 Phillips Curve



Keynesians believed that the economy spent most of its time in a range of unemployment rates well to the right of the natural rate and that unemployment rates to the left of the shaded area implied that inflation was likely to accelerate.

- *the Phillips curve* is a key element of the theory of the inflation-unemployment relationship, as a stable menu of options from which policymakers could choose.
- *Keynesians* believed that the Phillips curve was quite flat, particularly at high unemployment rates. It followed that when unemployment was high, the unemployment rate could be reduced at little cost in terms of increased inflation.
- *Monetarists*, on the other hand, believed the curve was quite steep, so expansionary demand management was likely to produce a significant amount of inflation without providing much benefit in terms of lower unemployment.

R18 The NAIRU

- The term NAIRU is an acronym for **Non-Accelerating Inflation Rate of Unemployment**（非加速通胀下的失业率）
- It is the rate of unemployment at which inflationary pressures are stable, below which inflation would accelerate, also known as the **natural rate of unemployment (NARU)**. **The reasons are as follows:**
 - Analysis in this area recognizes that not all labor is alike.
 - Structural factors related to training deficiencies, cultural patterns in all or some of the population, inefficiencies in the labor market, and the like can mean that the economy will effectively face labor shortages long before the unemployment rate reaches very low figures.
 - Example
 - ✓ If training is lower than demand, this segment faces shortage of trained workers and attendant wage pressure though the whole seems to have slack in the overall labor market.
 - ✓ Until training (supply) catches up with demand, the economy may carry a high NARU and NAIRU
- These rates vary from one economy to another and over time in a single economy

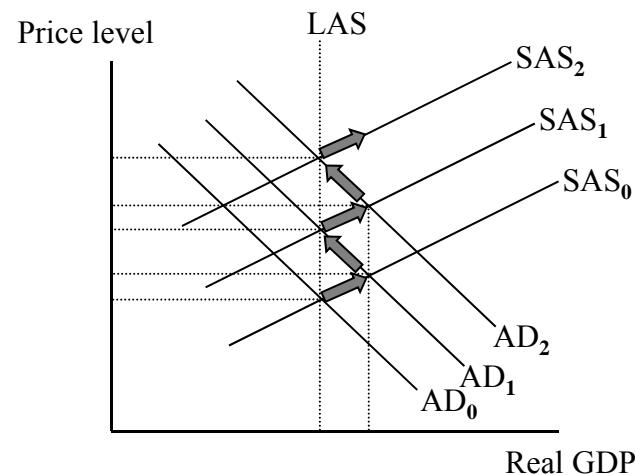
R18 How to determine cost-push inflation

- A complete picture only emerges when practitioners examine the trends alongside productivity measures.
 - Such assessments of wage-push inflation also find indicators in direct observations of the wage trends that, when they accelerate, might force businesses to raise prices (initiating the wage-price spiral).
 - Statistical agencies provide a wide array of wage-cost indicators:
 - ✓ hourly wage gauges, weekly earnings, and overall labor costs, including the outlays for benefits.
 - ✓ Some of these indicators include the effects of special overtime pay or bonuses; others do not.
 - Productivity, or output per hour, is an essential part of this inflation analysis.
 - ✓ $\text{Unit labor cost} = \text{wages/output}$. The lower ULC, the lower pressure.
 - ✓ Affecting factors: technology and training. If wages increase faster than the productivity due to excess labor demand, prices come under increasing upward.

R18 Demand-pull inflation

- **Demand-pull inflation:** an inflation that results from an initial increase in aggregate demand
 - Factors:
 - ✓ Increase in the quantity of money
 - ✓ Increase in government purchases
 - ✓ Increase in exports
- Steps in demand-pull inflation:
 - Step1: $AD_0 \rightarrow AD_1$, real GDP > potential GDP & inflation gap (short run effect)
 - Step2: workers demand higher money wage rate, $SAS_0 \rightarrow SAS_1$ (long run effect)
 - Step3: AD increases year after year. AD puts continual upward pressure on the price level. The economy now experience demand-pull inflation. (价格的持续上涨)

A Demand-pull Inflation Spiral



R18 Inflation Expectation

- Once inflation becomes embedded in an economy, businesses, workers, consumers, and economic actors of every kind begin to expect it and build those expectations into their actions. This reaction, in turn, creates an inflationary momentum of its own in a manner.
- Measuring inflation expectations is not easy.
 - Some practitioners gauge expectations by relying on past inflation trends and on the assumption that market participants largely extrapolate their past experiences.
 - In some markets, surveys of inflation expectations are available, although these are often biased by the way the questions are asked.
 - A third indicator becomes available when governments issue bonds that adjust in various ways to compensate holders for inflation, such as TIPS. By comparing the interest available on these bonds with other government bonds that do not offer such inflation-linked adjustments, practitioners can gauge the general level of inflation expectations among market participants and factor it into their own inflation forecasts and strategies.

R18 Example: Inflation Expectation

➤ **Example:**

1. Cost-push inflation most likely occurs when
 - A. unemployment rates are low.
 - B. unemployment rates are high,
 - C. unemployment is either high or low.
2. Unit labor costs measure:
 - A. hourly wage rates.
 - B. total labor compensation per hour.
 - C. a combination of hourly wages and output.
3. Demand-pull inflation:
 - A. is a discredited concept.
 - B. depends on the movements in commodity prices.
 - C. reflects the state of economic activity relative to potential.
4. Monetarists believe inflation reflects:
 - A. the growth of money.
 - B. the level of interest rates.
 - C. that there is no difference between monetarist positions and cost-push inflation.
5. The inflationary potential of a particular inflation rate depends on the economy's NAIRU or NARU, which in turn depends in part on:
 - A. the intensity of past cyclical swings:
 - B. the bargaining power of trade unions.
 - C. the skill set of the workforce relative to the economy's industrial mix.
6. Which of the following is not a problem with NARU and NAIRU?
 - A. They are not observable directly.
 - B. They work only in monetarist models.
 - C. They change over time given changes in technology and economic structure.

R18 Example: Inflation Expectation

➤ **Solution:**

Solution to 1: A is correct. When unemployment is below NAIRU, there is a shortage of labor that pushes up labor cost.

Solution to 2: C is correct. Unit labor costs reflect the labor cost in each unit of output.

Solution to 3: C is correct. When the economy is operating above its potential capacity allowed by the resources available, inflation will start to rise.

Solution to 4: A is correct. Monetarists emphasize the role of money growth in determining the inflation rate, especially in the long run. As Milton Friedman famously put it, "Inflation is always and everywhere a monetary phenomenon."

Solution to 5: C is correct. If the skill set of a large part of the workforce cannot satisfy the hiring need from the employers, the NAIRU of such an economy can be quite high.

Solution to 6: B is correct. NAIRU and NARU reflect the potential of an economy and thus cannot be directly observed from the economic data. They also change over time depending on technological progress and social factors.

R18 Economic Indicators

- **Leading economic indicators**: have turning points that usually precede overall economy
- **Coincident economic indicators**: have turning points that are usually close to overall economy
- **Lagging economic indicators**: have turning points that are usually later to overall economy
 - We should be aware that the classification leading, coincident, and lagging indicators reflect tendencies in the timing of their turning points, not exact relationship with the business cycle.
 - Not all changes in direction of leading indicator indexes have been followed by corresponding changes in the business cycle, and even when they have, the lead time has varied.
 - This common criticism is summed up in the often repeated comment, “Declines in stock prices have predicted nine of the last four recessions.”

R18 Economic Indicators

Leading	Reason
Average weekly hours, manufacturing	Because businesses will <u>cut overtime before laying off workers in a downturn</u> and increase it before rehiring in a cyclical upturn, these measures move up and down before the <u>general economy</u> .
Average weekly initial claims for unemployment insurance	This measure offers a very <u>sensitive test of initial layoffs and rehiring</u> .
Manufacturers' new orders for consumer goods and materials	Because businesses cannot wait too long to meet demands for consumer goods or materials without ordering, these gauges tend to <u>lead at upturns and downturns</u> . Indirectly, they capture changes in <u>business sentiment as well</u> , which also often leads the cycle.
Vendor performance, <u>slower deliveries diffusion index</u>	By measuring the speed at which businesses can complete and deliver an order, this gauge offers <u>a clear signal of unfolding demands on businesses</u> .
Manufacturers' new orders for non-defense capital goods	In addition to offering <u>a first signal of movement, up or down, in an important economic sector</u> , movement in this area also <u>indirectly captures business expectations</u> .
Building permits for new private housing units	Because most localities require permits before new building can begin, this gauge <u>foretells new construction activity</u> .

R18 Economic Indicators

Leading	Reason
S&P 500 Stock Index	Because <u>stock prices anticipate economic turning points</u> , both up and down, their movements offer a useful early signal on economic cycles.
Money supply, real M2	Because <u>money supply growth</u> measures the tightness or looseness of monetary policy, <u>increases in money beyond inflation indicate easy monetary conditions and a positive economic response</u> , whereas declines in real M2 indicate monetary restraint and a negative economic response.
Interest rate spread between 10-year treasury yields and overnight borrowing rates (federal funds rate)	Because <u>long-term yields express market expectations about the direction of short-term interest rates</u> , and rates ultimately follow the economic cycle up and down, a wider spread, by <u>anticipating short rate increases</u> , also <u>anticipates an economic upswing</u> . Conversely, a narrower spread, by anticipating short rate decreases, also anticipates an economic downturn.
Index of Consumer Expectations, University of Michigan	Because the consumer is about two-thirds of the U.S. economy and will <u>spend more or less freely according to his or her expectations</u> , this gauge offers early insight into <u>future consumer spending and consequently directions in the whole economy</u> .

R18 Economic Indicators

Coincident	Reason
Employees on non-agricultural payrolls	Once recession or recovery is clear, businesses <u>adjust their fulltime payrolls</u> .
Aggregate real personal income (less transfer payments)	By measuring the income flow from non-corporate profits and wages, this measure <u>captures the current state of the economy</u> .
Industrial Production Index	Measures industrial output, thus <u>capturing the behavior of the most volatile part of the economy</u> . The service sector tends to be more stable.
Manufacturing and trade sales	In the same way as aggregate personal income and the industrial production index, this aggregate offers a measure of <u>the current state of business activity</u> .
Lagging	Reason
Average Duration of Unemployment	Because <u>businesses wait until downturns look genuine to lay off</u> , and wait until recoveries look secure to rehire, this measure is important because it <u>lags the cycle on both the way down and the way up</u> .
Inventory—sales ratio	Because <u>inventories accumulate as sales initially decline and then</u> , once a business adjusts its ordering, become <u>depleted as sales pick up</u> , this ratio tends to lag the cycle.

R18 Economic Indicators

Lagging	Reason
Change in unit labor costs	Because businesses are slow to fire workers, these costs tend to rise into the early stages of recession as the existing workforce is used less intensely. Late in the recovery when the labor market gets tight, upward pressure on wages can also raise such costs. In both cases, there is a clear lag at cyclical turns.
Average bank prime lending rate	Because this is <u>a bank administered rate</u> , it tends to lag other rates that move either before cyclical turns or with them.
Commercial and industrial loans outstanding	Because <u>these loans frequently support inventory building</u> , they lag the cycle for much the same reason that the inventory—sales ratio does.
Ratio of consumer installment debt to income	Because consumers <u>only borrow heavily when confident</u> , this measure lags the cyclical upturn, but debt <u>also overstay</u> s <u>cyclical downturns</u> because households have trouble adjusting to income losses, causing it to lag in the downturn.
Change in consumer price index for services	Inflation generally adjusts to the cycle late, especially the more stable services area

R18 Identifying the Business Cycle Phase Based on Economic Indicators

- Analysts should use leading, coincident, and lagging indicators together to determine the phase of the business cycle.
- They should also use the composite indexes to confirm what is indicated by individual indicators.
- If a widely followed leading indicator such as stock prices or the yield changes direction, but most other leading indicators have not, an analyst should not yet conclude that a peak or trough is imminent.

R18 Example: Identifying the Business Cycle Phase

- Karen Trumbull, CFA, gathers the following economic reports for the United States in the most recent two months:

	Latest Month	Prior Month
Building permits (LD)	+1.8%	+0.7%
Commercial and industrial loans (LG)	-0.9%	-1.6%
Consumer price index for services (LG)	-0.1%	-0.2%
Industrial production (CO)	+0.2%	+0.0 %
New orders, nondefense capital goods (LD)	+2.2%	+1.6%
Personal income (CO)	+0.0 %	-0.4%

- Based on these indicators, what should Trumbull conclude about the phase of the business cycle?

R18 Example: Identifying the Business Cycle Phase

➤ Answer:

- Commercial and industrial loans and the CPI for services are lagging indicators. Industrial production and personal income are coincident indicators. These indicators suggest the business cycle has been in the contraction phase.
- Building permits and orders for nondefense capital goods are leading indicators. Increases in both of these in the latest two months suggest an economic expansion may be emerging.
- Taken together, these data indicate that the business cycle may be at or past its trough. This conclusion would be supported if the index of leading indicators and most of its other components are also increasing.

Framework of Economics

➤ SS 4 Microeconomic Analysis

- R13 demand and supply: introduction
- R14 demand and supply: consumer demand introduction
- R15 demand and supply: the firm
- R16 the firm and the market structure

➤ SS 5 Macroeconomic Analysis

- R17 aggregate output, price, and economic growth
- R18 understand business cycles
- R19 monetary and fiscal Policy

➤ SS 6 Economics in a Global Context

- R20 international trade and capital flow
- R21 currency exchange rate

R19 Monetary and Fiscal Policy

- Definition
- Monetary policy
- Central banks
- Fiscal policy

R19 Monetary and Fiscal Policy

- **Fiscal policy** refers to a government's use of spending and taxation to influence economic activity.
 - The budget is said to be balanced when tax revenues equal government expenditures.
 - A budget surplus occurs when government tax revenues exceed expenditures.
 - A budget deficit occurs when government expenditures exceed tax revenues.
- **Monetary policy** refers to the central bank's actions that affect the quantity of money and credit in an economy in order to influence economic activity.
 - Monetary policy is said to be expansionary (or accommodative or easy) when the central bank increases the quantity of money and credit in an economy.
 - When the central bank is reducing the quantity of money and credit in an economy, the monetary policy is said to be contractionary (or restrictive or tight).
- Both monetary and fiscal policies are used by policymakers with the goals of maintaining stable prices and producing positive economic growth. Fiscal policy can also be used as a tool for redistribution of income and wealth.

R19 Qualities and Functions of Money

➤ Qualities of money:

- Accepted to settle transactions
- Very hard to counterfeit
- Not too heavy compared to their value
- Divisible

➤ Functions of money:

- Medium of exchange or means of payment
- Unit of account
- Store of value

R19 Promissory Notes

➤ Promissory notes

- Were developed in the early stages of money development
- When customers deposited gold (or other precious metal) with early bankers, they were issued a promissory note, which was a promise by the banker to return that gold on demand from the depositor.
- Promissory notes themselves then became a medium of exchange.
- Bankers, recognizing that all the deposits would never be withdrawn at the same time, started lending a portion of deposits to earn interest. This led to what is called fractional reserve banking.

R19 How Money is Created

How Do the Banks Create Money ?

	reserve	loan
Bank1		100
Bank2	10	90
Bank3	9	81
...

$Ms = 100 / (1 - 0.9) = 1000$

$$\text{money created} = \frac{\text{new deposit}}{\text{reserve requirement}} = \frac{100}{0.1} = 1000$$

$$\text{money multiplier} = \frac{1}{\text{reserve requirement}} = \frac{1}{0.1} = 10$$

R19 Classification of Money

- **Narrow money** is the amount of notes (currency) and coins in circulation in an economy plus balances in checkable bank deposits.
- **Broad money** includes narrow money plus any amount available in liquid assets, which can be used to make purchases.
- According to the Federal Reserve Bank of New York:
 - **M1**: currency in the hands of the public; travelers checks; demand deposits; and other deposits against which checks can be written.
 - **M2**: includes M1, plus savings accounts, time deposits of under \$100,000, and balances in retail money market mutual funds.
- The European Central Bank describes their monetary aggregates as follows:

	M1	M2	M3
Currency in circulation	X	X	X
Overnight deposits	X	X	X
Deposits with an agreed maturity of up to 2 years		X	X
Deposits redeemable at notice of up to 3 months		X	X
Repurchase agreements			X
Money market fund shares / units			X
Debt securities issued with a maturity of up to 2 years			X

R19 Quantity Theory of Money

- *The quantity theory of money* states that quantity of money is some proportion of the total spending in an economy and implies the quantity equation of exchange:

$$\text{money supply} \times \text{velocity} = \text{price} \times \text{real output} \quad (MV = PY)$$

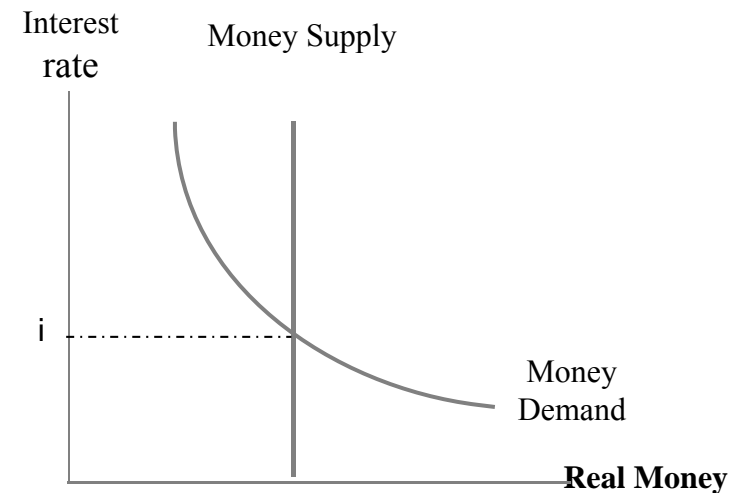
- *Price multiplied by real output* is total spending so that velocity is the average number of times per year each unit of money is used to buy goods or services. The equation of exchange must hold with velocity defined in this way.
- Monetarists believe that velocity and the real output of the economy change only slowly.
- Assuming that velocity and real output remain constant, any increase in the money supply will lead to a proportionate increase in the price level.
- The belief that real variables (real GDP and velocity) are not affected by monetary variables (money supply and prices) is referred to as *money neutrality*.

R19 Money Demand

- **The Demand for money** is largely determined by interest rates and it is also influenced by income level and price level
- Three reasons for holding money:
 - **Transaction demand:** Money held to meet the need for undertaking transactions. As the level of real GDP increases, the size and number of transactions will increase, and the demand for money to carry out transactions increases
 - **Precautionary demand:** Money held for unforeseen future needs. In the aggregate, the total amount of precautionary demand for money increases with the size of the economy
 - **Speculative demand:** Money that is available to take advantage of investment opportunities that arise in the future. It is inversely related to returns available in the market.

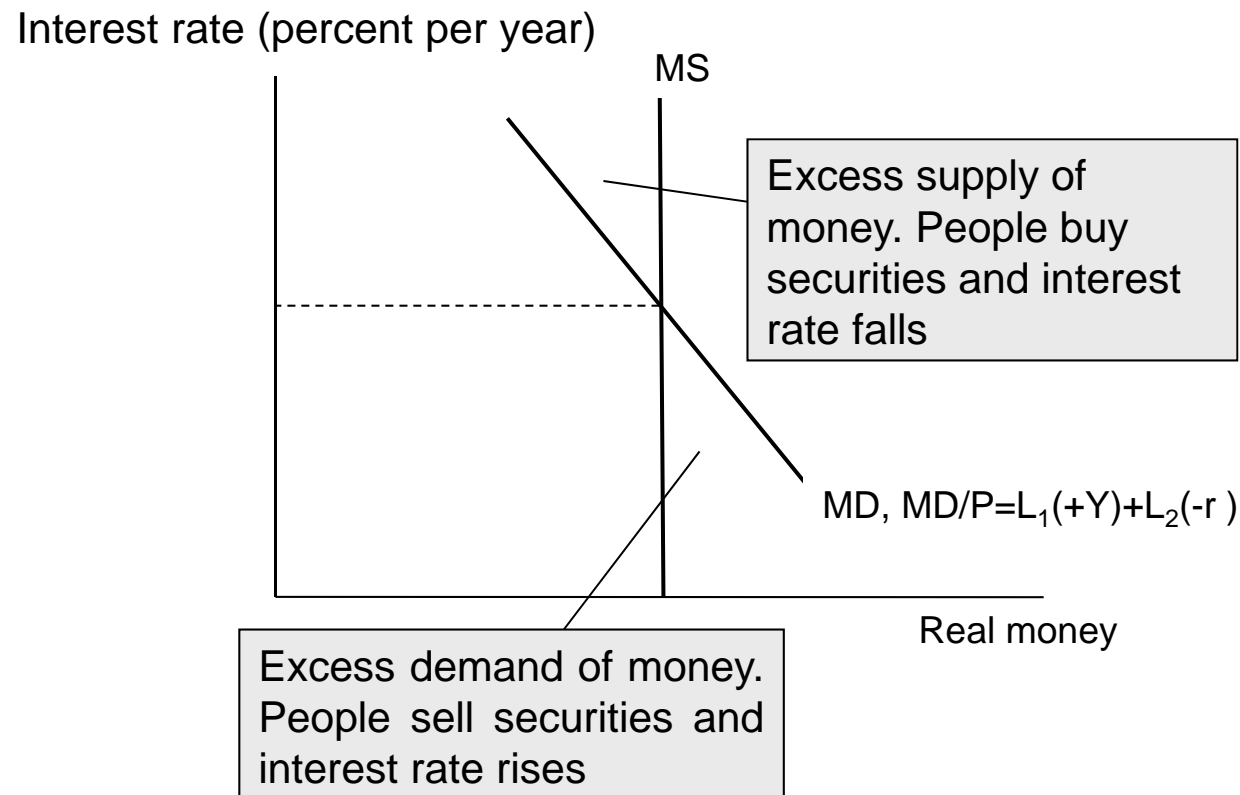
R19 Money Supply

- The supply of money is determined by the central bank and is not affected by changes in interest rates. Thus the supply of money curve is vertical
- At lower interest rates, firms and households choose to hold more money. At higher interest rates, the opportunity cost of holding money increases, and firms and households will desire to hold less money and more interest-bearing financial assets.
- Notice that as the Fed increases the money supply, the interest rate falls, which reduces the opportunity cost of holding money.



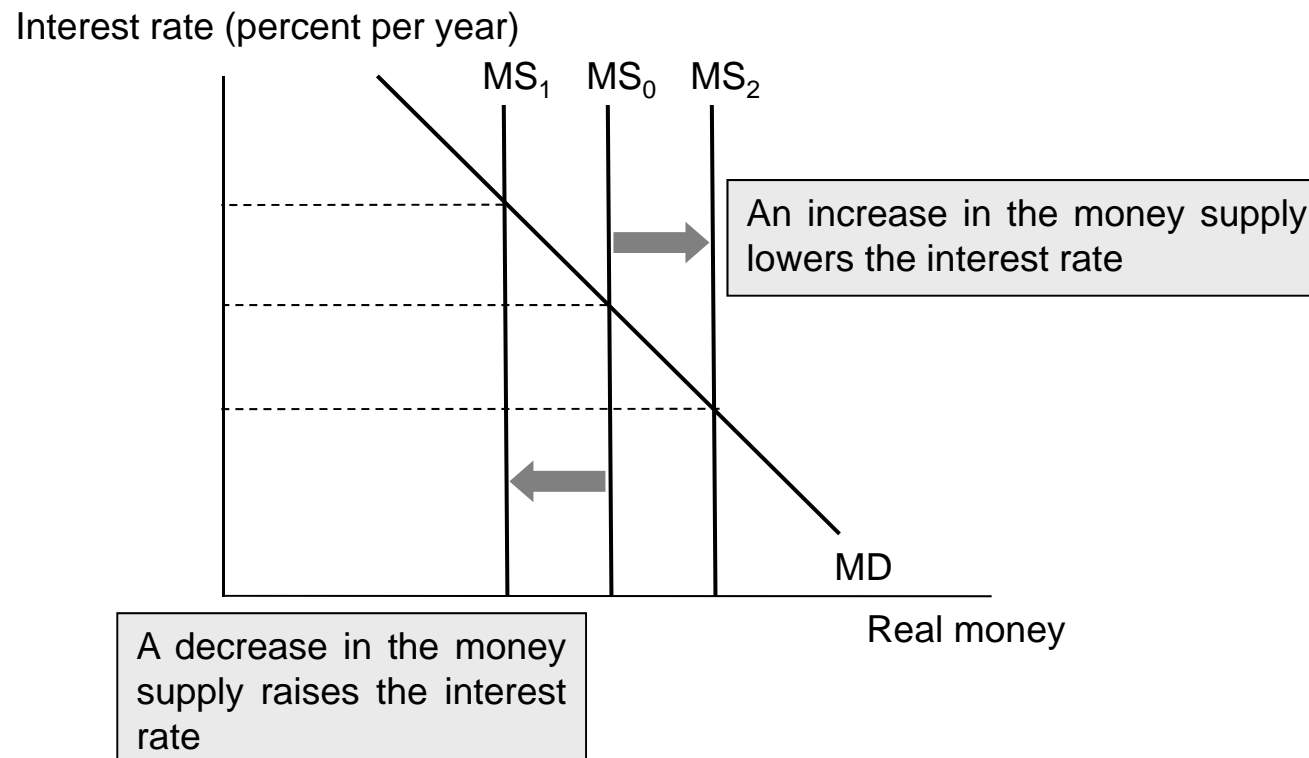
R19 Determinants of Money Demand and Supply

- Short-term interest rates are determined by the equilibrium between money supply and money demand



R19 Determinants of Money Demand and Supply

- Central bank can affect short-term interest rates by increasing or decreasing the money supply.



R19 Fisher Effect

- The ***Fisher effect*** states that the nominal interest rate is simply the sum of the real interest rate and expected inflation.

- $R_{\text{Nom}} = R_{\text{Real}} + E[I]$

R_{Nom} = nominal interest rate

R_{Real} = real interest rate

$E[I]$ = expected inflation

- The idea behind the Fisher effect is that real rates are relatively stable, and changes in interest rates are driven by changes in expected inflation. This is consistent with money neutrality.

- Investors are exposed to the risk that actual inflation may differ from expected inflation. Investors require an additional return (a risk premium) for bearing this risk, which we can consider a third component of a nominal interest rate.

$$R_{\text{Nom}} = R_{\text{Real}} + E[I] + \text{RP}$$

RP = risk premium for inflation uncertainty

R19 Role and Objectives of Central Bank

➤ Role of central bank:

- Sole supplier of currency
- Banker to the government and other banks
- Lender of last resort
- Supervise banks
- Holder of gold and foreign exchange reserves
- Conductor of monetary policy

➤ Objectives of a central bank:

- Control inflation so as to promote price stability
- Stability in exchange rates with foreign currencies
- Full employment
- Sustainable positive economic growth
- Moderate long-term interest rates

R19 Primary Objective of a Central Bank

- The primary objective of a central bank is to control inflation so as to promote price stability.
 - High inflation is not conducive to a stable economic environment.
- **Expected inflation** leads to
 - **menu costs** (i.e., cost to businesses of constantly having to change their prices)
 - **shoe leather costs** (i.e., costs to individuals of making frequent trips to the bank so as to minimize their holdings of cash that are depreciating in value due to inflation)
- **Unanticipated (unexpected) inflation** can, in addition:
 - Lead to inequitable transfers of wealth between borrowers and lenders (including losses to savings)
 - Give rise to risk premium in borrowing rates and the prices of other assets
 - Reduce the information content of market price

R19 The costs of inflation

- The costs imposed on an economy of unanticipated inflation are greater than those of perfectly anticipated inflation.
 - **Perfectly anticipated:** The prices of all goods and wages could be indexed to this inflation rate. Increased demand → price increases more; decreased demand → price increases less.
 - One effect of high inflation: the cost of holding money rather than interest-bearing securities is higher → decrease the quantity of money that people willingly hold and impose some costs of more frequent movement of money from interest-bearing securities to cash
 - **Unanticipated inflation:**
 - ✓ Inflation > expected, borrowers gain
 - ✓ Inflation < expected, lenders gain
 - ✓ volatile inflation rates, lenders require higher interest rates
 - ✓ information about supply and demand from changes in prices becomes less reliable.
 - ✓ destabilizing effects: unexpected inflation can increase the magnitude or frequency of business cycles, impose real costs on an economy.

R19 Inflation Targeting and Interest Rate Targeting

➤ Interest rate targeting

- In the past, some have used interest rate targeting, increasing the money supply when specific interest rates rose above the target band and decreasing the money supply when rates fell below the target band.

➤ Inflation targeting

- Currently, inflation targeting is most widely used for making monetary policy decisions and is the method required by law in some countries.
 - ✓ most common is 2%, with a permitted deviation of $\pm 1\%$
 - ✓ Why not targeting 0%? Because variations would allow for negative inflation, which is considered disruptive to the smooth functioning of an economy.
 - ✓ Central banks are not necessarily targeting current inflation, which is the result of prior policy and events, but inflation in the range of two years in the future.

➤ Exchange rate targeting (refer to next page)

R19 Exchange Rate Targeting

➤ Exchange rate targeting:

- Many developing economies choose to operate monetary policy by targeting their currency's exchange rate, rather than an explicit level of domestic inflation.
- Such targeting involves setting a fixed level or band of values for the exchange rate against a major currency, with the central bank supporting the target by buying and selling the national currency in foreign exchange markets.
- By tying a domestic currency to that of an economy with a good track record on inflation, the domestic economy would effectively "import" the inflation of the foreign economy.
- **Result:** Interest rates and conditions in the domestic economy must adapt to accommodate the target and domestic interest rates and money supply can become more volatile.
- **Limitations:** (refer to next page)

R19 Exchange Rate Targeting

➤ Exchange rate targeting:

- **Limitations:** There are limits on how much influence currency purchases or sales can have on exchange rates over time.
 - ✓ a country may run out of foreign reserves with which to purchase its currency when the exchange value of its currency is still below the target exchange rate.
- **Net effect:**
 - ✓ the targeting country will have the same inflation rate as the targeted currency
 - ✓ the targeting country will need to follow monetary policy and accept interest rates that are consistent with this goal, regardless of domestic economic circumstances.

R19 Tools of the Central Bank

➤ Policy rate

- In the United States, banks can borrow funds from the Fed. The rate at which banks can borrow reserves from the Fed is termed the discount rate. For the European Central Bank (ECB), it is called the refinancing rate.
- One way to lend money to banks is through a repurchase agreement. The Bank of England uses this method, and policy rate is called the two-week repo (repurchase) rate.
- In the United States, the federal funds rate is the rate that banks charge each other on overnight loans of reserves.
- A lower rate reduces banks' cost of funds encourage lending, and tends to decrease interest rates.
- A higher policy rate increases banks' cost of funds discourage lending, and tends to increase interest rates.

R19 Tools of the Central Bank

➤ Reserve requirements

- Reserve requirement \uparrow - available funds for lending \downarrow - money supply \downarrow - interest rate \uparrow
- This tool only works well to increase the money supply if banks are willing to lend and customers are willing to borrow.

➤ Open market operations

- Central bank buy securities – funds available funds for lending \uparrow - money supply \uparrow - interest rate \downarrow
- This tool is the Fed's most commonly used tool and is important in achieving the federal funds target rate (policy rate).

R19 Qualities of Effective Central Banks

➤ Independence

- It should be free from political interference.
- Independence should be thought of in relative terms (degrees of independence) rather than absolute terms.
- Independence can be evaluated based on both operational independence and target independence.
 - ✓ Operational independence means that the central bank is allowed to independently determine the policy rate.
 - ✓ Target independence means the central bank also defines how inflation is computed, sets the target inflation level, and determines the horizon over which the target is to achieved.

➤ Credible

- Central banks should follow through on their stated intentions.
- If government with large debts, instead of a central bank, set an inflation target, the target would not be credible because the government has an incentive to allow inflation to exceed the target level.
- A credible central bank's targets can become self-fulfilling prophecies. Actual inflation will then be close to that level.

➤ Transparent

- Transparency on the part of central banks aids their credibility. Transparency means central banks periodically disclose the state of the economic environment by issuing Inflation Reports.

R19 Example: Central Bank Effectiveness

➤ Example:

1. The reason some inflation-targeting banks may target low inflation and not 0 percent inflation is best described by which of the following statements?

- A. Some inflation is viewed as being good for an economy.
- B. Targeting zero percent inflation runs a higher risk of a deflationary outcome.
- C. It is very difficult to eliminate all inflation from a modern economy.

2. The degree of credibility that a central bank is afforded by economic agents is important because:

- A. they are the lender of last resort.
- B. their targets can become self-fulfilling prophecies.
- C. they are the monopolistic suppliers of the currency.

➤ Solution:

Solution to 1: B is correct. Inflation targeting is art, not science. Sometimes inflation will be above target and sometimes below. Were central banks to target 0 percent, then inflation would almost certainly be negative on some occasions. If a deflationary mindset then sets in among economic agents, it might be difficult for the central bank to respond to this because they cannot cut interest rates below zero.

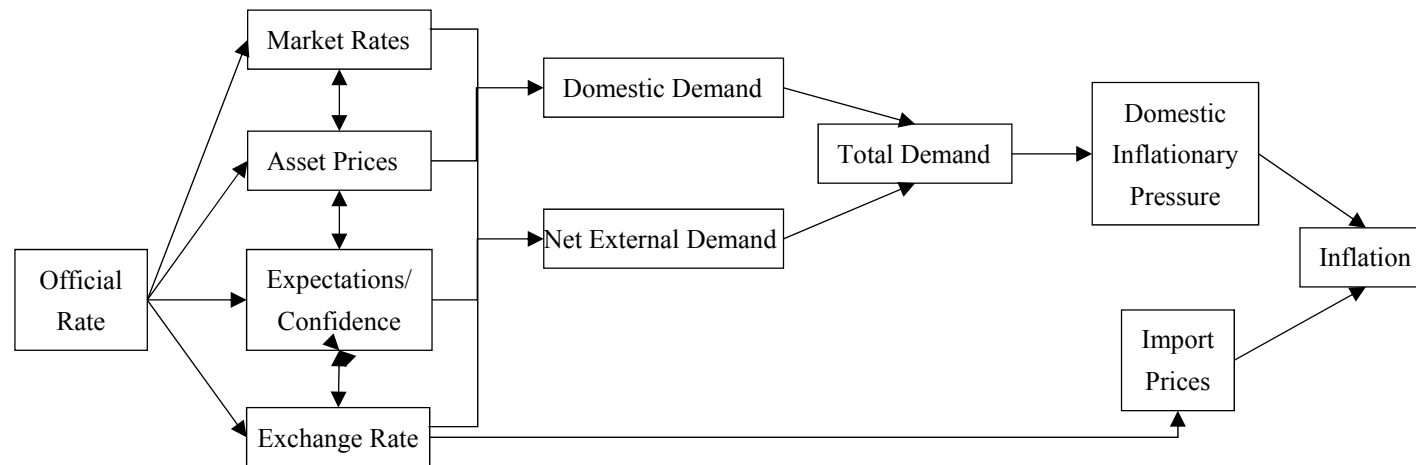
Solution to 2: B is correct. If a central bank operates within an inflation targeting regime and if economic agents believe that it will achieve its target, this expectation will become embedded into wage negotiations, for example, and become a self-fulfilling prophecy. Also, banks need to be confident that the central bank will lend them money when all other sources are closed to them; otherwise, they might curtail their lending drastically, leading to a commensurate reduction in money and economic activity.

R19 Transmission Mechanism

- Central banks' manipulation of short-term rates does affect real variables such economic growth and the inflation rate through a transmission mechanism.
- The steps in the transmission mechanism are:
 - The central bank buys securities, which increase bank reserves.
 - The interbank lending rate decreases as the increase in the supply of loanable funds decreases the equilibrium rate for loans.
 - Longer-term interest rates also decrease.
 - The decrease in real interest rates causes the currency to depreciate in the foreign exchange market.
 - The decrease in long-term interest rates increases business investment in plant and equipment.
 - Lower interest rates cause consumers to increase their purchases of houses, autos, and durable goods.
 - Depreciation of the currency increases foreign demand for domestic goods.
 - These increases in consumption, investment, and net exports all increase aggregate demand.
 - The increase in aggregate demand increases inflation, employment, and real GDP.

R19 Transmission Mechanism

- The transmission mechanism for a decrease in interbank lending rates affects four things simultaneously:
- Market rates decrease due to banks adjusting their lending rates for the short and long term.
 - Asset prices increase because lower discount rates are used for computing present values.
 - Firms and individuals raise their expectations for economic growth and profitability. They may also expect the central bank to follow up with further interest rate decreases.
 - The domestic currency depreciates due to an outflow of foreign money as real interest rates decline.



R19 Determine whether a Monetary Policy is Expansionary or Contractionary

- An economy's long-term sustainable real growth rate is called the real trend rate or, the trend rate.
- The neutral interest rate of an economy is the growth rate of the money supply that neither increases nor decreases the economic growth rate:
Neutral interest rate = real trend rate of economic growth + inflation target
 - Policy rate > Neutral rate: contractionary
 - Policy rate < Neutral rate: expansionary
- Monetary policy is often adjusted to reflect the source of inflation.
 - If inflation is above target due to higher aggregate demand, then contractionary monetary policy may be an appropriate response to reduce inflation.
 - If inflation is higher due to supply shocks, and the economy is already operating below full employment, a contractionary monetary policy may make a bad situation worse.

R19 Limitation of Monetary Policy

- The transmission mechanism for monetary policy does not always produce the intended results.
 - Long-term rates may not rise and fall with short-term rates because of the effect of monetary policy changes on expected inflation.
 - ✓ If individuals and businesses decrease in the money supply intended to reduce inflation. The future inflation rates will be low. Because long-term bond yields include a premium for expected inflation, long-term rates could fall (tending to increase economic growth).
 - ✓ While the central bank has increased short-term rates in order to slow economic activity could lead to an increase in expected inflation rates and long-term bond yields, even as short-term rates fall.
 - ◆ Monetary tightening may be viewed as too extreme, increasing the probability of a recession, making long-term bonds more attractive and reducing long-term interest rates.
 - ◆ Bond market participants that act in this way have been called ***bond market vigilantes***.
 - ✓ When the central bank's policy is credible and investors believe that the inflation target rate will be maintained over time, this effect on long-term rates will be small.

R19 Limitation of Monetary Policy

- Another situation in which the transmission mechanism may not perform as expected is if demand for money becomes very elastic and individuals willingly hold more money even without a decrease in short-term rates. Such a situation is called a ***liquidity trap***.
 - ✓ Increasing growth of the money supply will not decrease short-term rates under these conditions because individuals hold the money in cash balances instead of investing in interest-bearing securities.
 - ✓ If an economy is experiencing deflation even though money supply policy has been expansionary, liquidity trap conditions may be present.
 - ◆ Deflation is more difficult for central banks to reverse (mindset)
- Another reason standard tools for increasing the money supply might not increase economic is that even with increasing excess reserves, banks may not be willing to lend.
 - ✓ Banks decreased their lending, even as money supplies were increased and short-term rates fell.
 - ✓ With short-term rates near zero, economic growth still poor, and a real threat of deflation, central banks began a policy termed ***quantitative easing***.

R19 Monetary Policy in Developing Economies

- Developing economies often face additional challenges when implementing monetary policy:
- Absence of liquid bond markets through which to conduct open market operations.
 - Lack of credibility resulting from prior poor track record in controlling inflation.
 - Rapid changes in the economy, making it difficult to ascertain the trend rate (and, hence, the neutral interest rate).
 - Rapid financial innovation resulting in changes in the money supply definition.
 - Political interference resulting in a lack of central bank independence.

R19 Fiscal Policy

- Fiscal policy refers to a government's use of spending and taxation to meet macroeconomic goals.
 - Keynesian economists believe that fiscal policy, through its effect on aggregate demand, can have a strong effect on economic growth when the economy is operating at less than full employment.
 - Monetarists believe that the effect of fiscal stimulus is only temporary and that monetary policy should be used to increase **or** decrease inflationary pressures over time. Monetarists do not believe that monetary policy should be used in an attempt to smooth cyclical changes in economic activity.
- Objectives of fiscal policy may include:
 - Influencing the level of economic activity and aggregate demand
 - Redistributing wealth and income among segments of the population
 - Allocating resources among economic agents and sectors in the economy

R19 Fiscal Policy Tools

➤ Spending Tools

- **Transfer payments**: Redistribute wealth, taxing some and making payments to others, transfer payments are not included in GDP computations. (e.g: social security and unemployment insurance benefits)
- **Current spending**: refers to government purchases of goods and services on an ongoing and routine basis.
- **Capital spending**: refers to government spending on infrastructure such as roads, schools, bridges, and hospitals. Capital spending is expected to boost future productivity of the economy

➤ Justification for spending tools

- Provide services such as national defense that benefit all the residents in a country.
- Invest in infrastructure to enhance economic growth
- Support the country's growth and unemployment targets by directly affecting aggregate demand
- Provide a minimum standard of living.
- Subsidize investment in research and development for certain high-risk ventures consistent with future economic growth or other goals (e.g., green technology)

R19 Fiscal Policy Tools

➤ Revenue Tools

- Direct taxes are levied on income or wealth. These include income taxes, taxes on income for national insurance, wealth taxes, estate taxes, corporate taxes, capital gains taxes, and Social Security taxes. Some progressive taxes (such as income and wealth taxes) generate revenue for wealth and income redistributing.
- Indirect taxes are levied on goods and services. These include sales taxes, value-added taxes (VATs), and excise taxes. Indirect taxes can be used to reduce consumption of some goods and services (e.g., alcohol, tobacco, gambling).

➤ Desirable attributes of tax policy

- Simplicity to use and enforce
- Efficiency, having the least interference with market forces and not acting as a deterrent to working.
- Fairness is quite subjective, but two commonly held beliefs are
 - ✓ Horizontal equality: people in similar situations should pay similar taxes
 - ✓ Vertical equality: richer people should pay more in taxes
- Sufficiency, in that taxes should generate sufficient revenues to meet the spending needs of the government

R19 Advantages and Disadvantages of Fiscal Policy Tools

➤ Advantages of fiscal policy tools

- Social policies such as discouraging tobacco use can be implemented very quickly via indirect taxes
- Quick implementation of indirect taxes also means that government revenues can be increased without significant additional costs

➤ Disadvantages of fiscal policy tools

- Direct taxes and transfer payments take time to implement, delaying the impact of fiscal policy
- Capital spending also takes a long time to implement. The economy may have recovered by the time its impact is felt.

R19 Fiscal Multiplier

➤ Fiscal multiplier

- Fiscal multiplier = $\frac{1}{1 - \text{MPC}(1-t)} = \frac{1}{1 - b \times (1-t)}$
- MPC: Marginal propensity of consumption (b)
- The fiscal multiplier is inversely related to the tax rate (higher tax rate decreases the multiplier) and directly related to the marginal propensity to consume (higher MPC increases the multiplier).

➤ **Example:** consider an increase in government spending of \$100, when the MPC is 80%, and the tax rate is 25%. The fiscal multiplier is $1/[1 - 0.8 (1-0.25)] = 2.5$, and the increase of \$100 in government spending has the potential to increase aggregate demand by \$250.

R19 Balanced Budget Multiplier

- In order to balance the budget, the government could increase taxes by \$100 to just offset a \$100 increase in spending.
 - An increase in taxes will decrease disposable income and consumption expenditures, thereby decreasing aggregate demand.
 - The initial decrease in spending from a tax increase of \$100 is $100 * MPC = 100 * 0.8 = \80
 - The multiplier effect is the same as we described for a direct increase in government spending, and the overall decrease in aggregate demand for a \$100 tax increase is $100(MPC) * \text{fiscal multiplier} = 100(0.8)(2.5) = \200 .
 - Combining the total increase in aggregate demand from a \$100 increase in government spending with the total decrease in aggregate demand from a \$100 tax increase shows that the net effect on aggregate demand of both is an increase of $\$250 - \$200 = \$50$, so we can say that the ***balanced budget multiplier*** is positive.
- If instead of a \$100 increase in taxes, increase taxes by $100/MPC = 100/0.8 = \$125$ and increase government spending by \$100, the net effect on aggregate demand would be zero.

R19 Ricardian Equivalence

- **Ricardian Equivalence:** Increases in the current deficit mean greater taxes in the future.
 - To maintain their preferred pattern of consumption over time, taxpayers may increase current savings (reduce current consumption) in order to offset the expected cost of higher future taxes.
 - If taxpayers reduce current consumption and increase current saving by just enough to repay the principal and interest on the debt the government issued to fund the increased deficit, there is no effect on aggregate demand.
- If taxpayers underestimate their future liability for servicing and repaying the debt, so that aggregate demand is increased by equal spending and tax increases, Ricardian equivalence does not hold.

R19 Arguments for being Concerned with the size of fiscal deficit

➤ **Debt ratio**: Aggregate debt to GDP

- If the real interest rate on the government's debt is higher than the real growth rate of the economy, then the debt ratio will increase over time (keeping tax rates constant).
- If the real interest rate on government's debt is lower than real growth in GDP, the debt ratio will decrease (i.e., improve) over time.

➤ **Arguments for being Concerned with the size of fiscal deficit**:

- Higher deficits lead to higher future taxes. Higher future taxes will lead to disincentives to work and entrepreneurship. This leads to lower long-term economic growth
- If markets lose confidence in the government, investors may not be willing to refinance the debt. This can lead to the government defaulting (if debt is in a foreign currency) or having to simply "print money" (if the debt is in local currency). Printing money would ultimately lead to higher inflation
- Increased government borrowing will tend to increase interest rates, and firms may reduce their borrowing and investment spending as a result, decreasing the impact on aggregate demand of deficit spending. This is referred to as the **crowding-out effect** because government borrowing is taking the place of private sector borrowing.

R19 Arguments against being Concerned with the Size of Fiscal Deficit

➤ Arguments against being concerned with the size of fiscal deficit:

- If the debt is primarily being held by domestic citizens, the scale of the problem is overstated.
- If the debt is used to finance productive capital investment, future economic gains will be sufficient to repay the debt.
- Fiscal deficits may prompt needed tax reform.
- Deficits would not matter if private sector savings in anticipation of future tax liabilities just offsets the government deficit (Ricardian equivalence holds).
- If the economy is operating at less than full capacity, deficits do not divert capital away from productive uses. On the contrary, deficits can aid in increasing GDP and employment.

R19 Implementation of Fiscal Policy

- Fiscal policy is implemented through changes in taxes and spending. This is called discretionary fiscal policy.
 - During recessions, actions can be taken to increase government spending or decrease taxes. Either change tends to strengthen the economy by increasing aggregate demand, putting more money in the hands of corporations and consumers to invest and spend.
 - During inflationary economic booms, actions can be taken to decrease government spending or increase taxes. Either change tends to slow the economy by decreasing aggregate demand, taking money out the hands of corporations and consumers, causing both investment and consumption spending to fall.

R19 Limitations of Discretionary Fiscal Policy

➤ *Limitations* of Discretionary Fiscal Policy:

- Economic forecasts might be wrong, leading to incorrect policy decisions.
- Complications arise in practice that delay both the implementation of discretionary fiscal policy and the impact of policy changes on the economy.
- The lag can be divided into three types:
 - ✓ **Recognition lag** : Discretionary fiscal policy decisions are made by a political process. The state of the economy is complex, and it may take policymakers time to recognize the nature and extent of the economic problems.
 - ✓ **Law-making lag**: The time governments take to discuss, vote on, and enact fiscal policy changes.
 - ✓ **Impact lag**: The time between the enactment of fiscal policy changes and when the impact of the changes on the economy actually takes place. It takes time for corporations and individuals to act on the fiscal policy changes, and fiscal multiplier effects occur only over time as well.

R19 Macroeconomic Issues May Hinder Usefulness of Fiscal Policy

- Additional macroeconomic issues may *hinder usefulness of fiscal policy*:
- **Misreading economic statistics:** The full employment level for an economy is not precisely measurable. If the government relies on expansionary fiscal policy mistakenly at a time when the economy is already at full capacity, it will simply drive inflation higher.
 - **Crowding-out effect:** Expansionary fiscal policy may crowd out private investment, reducing the impact on aggregate demand.
 - **Supply shortages:** If economic activity is slow due to resource constraints (low availability of labor or other resources) and not due to low demand, expansionary fiscal policy will fail to achieve its objective and will probably lead to higher inflation.
 - **Limits to deficits:** There is a limit to expansionary fiscal policy. If the markets perceive that the deficit is already too high as a proportion of GDP, funding the deficit will be problematic. This could lead to higher interest rates and actually make the situation worse.
 - **Multiple targets:** If the economy has high unemployment coupled with high inflation, fiscal policy cannot address both problems simultaneously.

R19 Fiscal Policy Is Expansionary or Contractionary

- A government's intended fiscal policy is not necessarily obvious from just examining the current deficit.
- Consider an economy that is in recession so that transfer payments are increased and tax revenue is decreased, leading to a deficit. This does not necessarily indicate that fiscal policy is expansionary as, at least to some extent, the deficit is a natural outcome of the recession without any explicit action of the government.
- Economists often use a measure called the *structural (or cyclically adjusted) budget deficit* to gauge fiscal policy. This is the deficit that would occur based on current policies if the economy were at full employment.

R19 Interaction of Monetary and Fiscal Policy

- **Expansionary fiscal and monetary policy:** the impact will be highly expansionary taken together. Interest rates will usually be lower (due to monetary policy), and the private and public sectors will both expand.
- **Contractionary fiscal and monetary policy:** aggregate demand and GDP would be lower, and interest rates would be higher due to tight monetary policy. Both the private and public sectors would contract.
- **Expansionary fiscal policy + contractionary monetary policy:** aggregate demand will likely be higher (due to fiscal policy), while interest rates will be higher (due to increased government borrowing and tight monetary policy). Government spending as a proportion of GDP will increase
- **Contractionary fiscal policy + expansionary monetary policy:** interest rates will fall from decreased government borrowing and from the expansion of the money supply, increasing both private consumption and output. Government spending as a proportion of GDP will decrease due to contractionary fiscal policy. The private sector would grow as a result of lower interest rates.

R19 Interaction of Monetary and Fiscal Policy

Monetary policy	Fiscal policy	Interest rate	output	Private spending	Public spending
Tight	Tight	higher	lower	lower	lower
Easy	Easy	lower	higher	higher	higher
Tight	Easy	higher	higher	lower	higher
Easy	Tight	lower	varies	higher	lower

- **Tight monetary policy/easy fiscal policy:** if taxes are cut or government spending rises, the expansionary fiscal policy will lead to a rise in aggregate output. If this is accompanied by a reduction in money supply to offset the fiscal expansion, then interest rates will rise and have a negative effect on private sector demand. We have higher output and higher interest rates, and government spending will be a larger proportion of overall national income.
- **Easy monetary policy/tight fiscal policy:** if a fiscal contraction is accompanied by expansionary monetary policy and low interest rates, then the private sector will be stimulated and will rise as a share of GDP, while the public sector will shrink.

R19 Interaction of Monetary and Fiscal Policy

- The fiscal multipliers for different types of fiscal stimulus differ, and the effects of expansionary fiscal policy are greater when it is combined with expansionary monetary policy.
- The fiscal multiplier for direct government spending increase has been much higher than the fiscal multiplier for increases in transfers to individuals or tax reductions for workers.
 - Within this category, government transfer payments to the poor have the greatest relative impact, followed by tax cuts for workers, and broader-based transfers to individuals (not targeted).
- For all types of fiscal stimulus, the impact may reflect the impact of greater inflation, falling real interest rates, and the resulting increase in business investment.

Framework of Economics

➤ SS 4 Microeconomic Analysis

- R13 demand and supply: introduction
- R14 demand and supply: consumer demand introduction
- R15 demand and supply: the firm
- R16 the firm and the market structure

➤ SS 5 Macroeconomic Analysis

- R17 aggregate output, price, and economic growth
- R18 understand business cycles
- R19 monetary and fiscal Policy

➤ SS 6 Economics in a Global Context

- R20 international trade and capital flow
- R21 currency exchange rate

R20 International trade and capital flows

- International trade
- Balance of Payments Components
- International organization

R20 Basic Terminology

- **Imports:** Goods and services that firms, individuals, and governments purchase from producers in other countries.
- **Exports:** Goods and services that firms, individuals, and governments from other countries purchase from domestic producers.
- **Autarky or closed economy:** A country that does not trade with other countries.
- **Free trade:** A government places no restrictions or charges on import and export activity.
- **Trade protection:** A government places restrictions, limits, or charges on exports or imports.
- **World price:** The price of a good or service in world markets for those to whom trade it's not restricted.
- **Domestic price:** The price of a good or service in the domestic country, which may be equal to the world price if trade is permitted or different from the world price when the domestic country restricts trade.
- **Net exports:** The value of a country's exports minus the value of its imports over some period.
- **Trade surplus:** Net exports are positive.
- **Trade deficit:** Net exports are negative.
- **Terms of trade:** The ratio of an index of the prices of a country's exports to an index of the prices of its imports expressed relative to a base value of 100.
- **Foreign direct investment:** Ownership of productive resources (land, factories, natural resources) in a foreign country.
- **Multinational corporation:** A firm that has made foreign direct investment in one or more foreign countries, operating production facilities and subsidiary companies in foreign countries.

R20 GDP and GNP

- GDP measures the market value of all final goods and services produced by factors of production located within a country/economy during a given period of time, generally a year or a quarter.
- GNP measures the market value of all final goods and services produced by factors of production supplied by residents of a country, regardless of whether such production takes place within the country or outside of the country.
- Difference
 - GDP includes, and GNP excludes, the production of goods and services or income to capital owned by foreigners within that country.
 - GNP includes, and GDP excludes, the production of goods and services or income to capital owned by its citizens outside of the country.
- GDP is more closely related to economic activity within a country and so to its employment and growth.

R20 Benefit and Cost of International Trade

- Benefits of trade:
 - Gains from exchange and specialization
 - Gains from economies of scale as companies add new markets for their products.
 - Great variety of products available to households and firms
 - Increased competition and more efficient allocation of resources
- Cost of trade:
 - Compete with imported goods in domestic industries
 - Unemployment rate increase
 - Workers have to retrain to qualify for the new jobs
- Overall, the benefits of trade are greater than the costs for economies as a whole, so that the “winner” could conceivably compensate the “loser” and still be better off.

R20 Absolute and Comparative Advantage

- A country is said to have an **absolute advantage** in the production of a good if it can produce the good at lower cost in terms of resources than that of another country.
- A country is said to have a **comparative advantage** in the production of a good if its opportunity cost in terms of other goods that could be produced instead is lower than that of another country.
- **The law of comparative advantage** holds that trading partners can be made better off **if they specialize in the production of goods for which they are the low-opportunity cost producer** and trade for those goods for which they are the high-opportunity cost producer.
 - A country gains from international trade when it exports those goods for which it has a comparative advantage and imports those goods for which it does not.
- As long as opportunity costs differ, two countries can both benefit from trade.

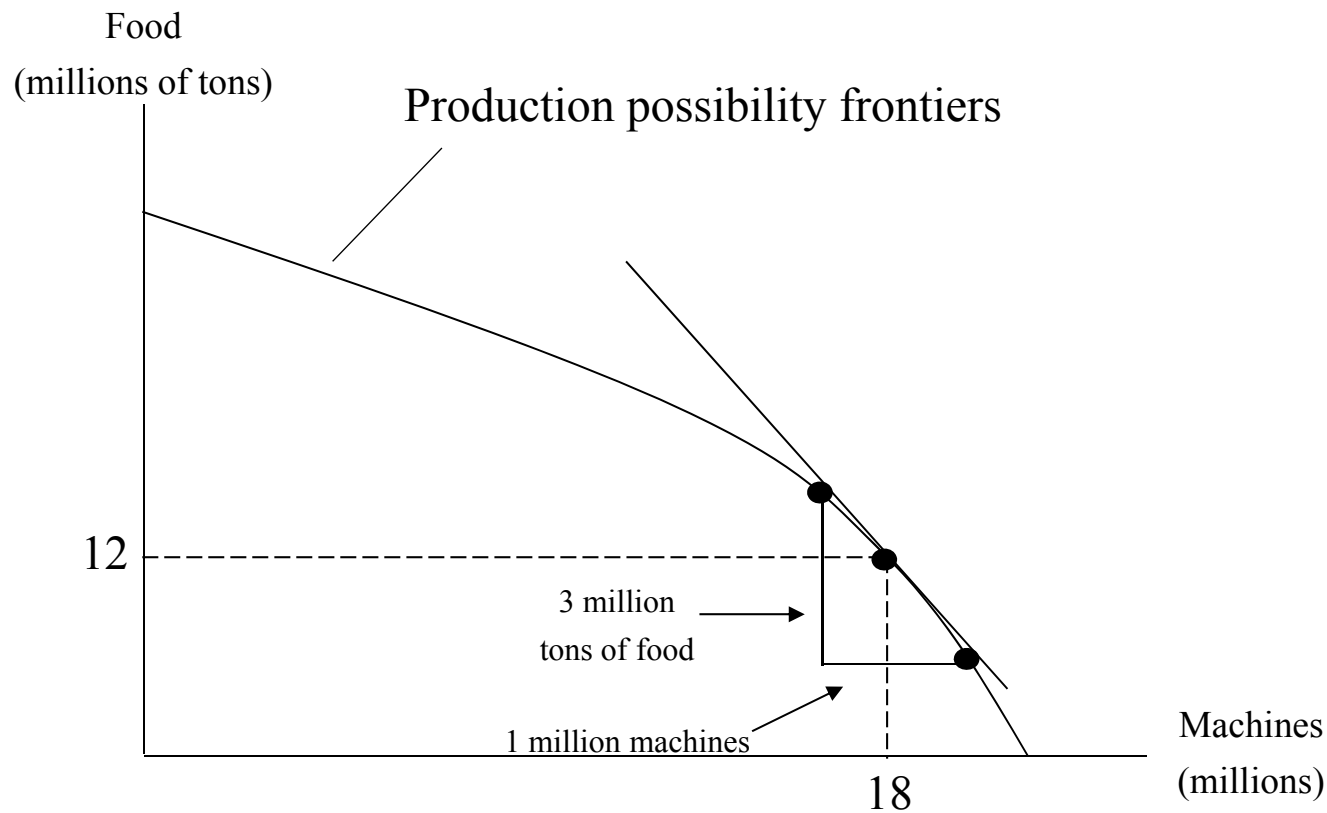
R20 Absolute and Comparative Advantage

- If two countries have different opportunity cost of producing goods, each will have a comparative advantage in some goods, and trade will increase the total production and consumption possibilities in both countries, improving economic welfare.
- When each country specializes in the good for which they have a comparative advantage and trades each other, there are clear gains existed.

<div>Country Product</div>	A	B
X	10	9
Y	5	3

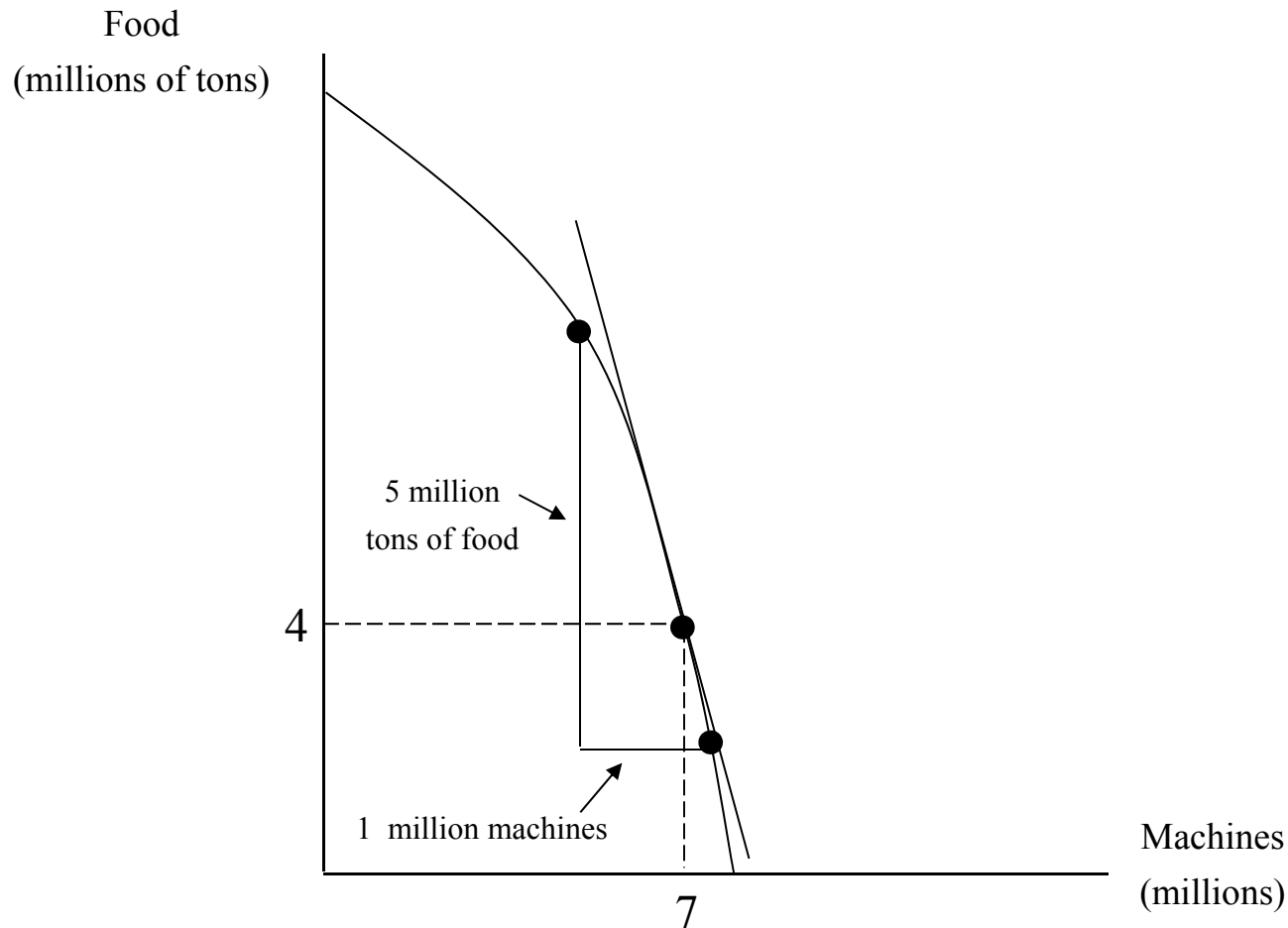
R20 Absolute and Comparative Advantage

- Expanded consumption opportunities for two countries
 - Production Possibility Frontier for country Alton



R20 Absolute and Comparative Advantage

- Expanded consumption opportunities for two countries
 - Production Possibility Frontier for country Borton



R20 Absolute and Comparative Advantage

	<i>Without Trade</i>		<i>With Trade</i>	
	<i>Machinery</i>	<i>Food</i>	<i>Machinery</i>	<i>Food</i>
Alton	18 million	12 million tons	20.0 million	6million tons
Borton	7 million	4 million tons	5.8 million	10 million tons
Total	25 million	16 million tons	25.8 million	16 million tons

- For Alton, the opportunity cost of producing another million units of machinery is 3 million tons of food, while for Borton, the opportunity cost of producing another million units of machinery is 5 million tons of food as long as their opportunity costs of production differ, trade will allow both countries to consume more than they can without trade.
- Since Alton has a comparative advantage in the production of machinery, it will be advantageous for Alton to produce more machinery and to trade with Borton for food. For example, Alton could produce 2 million more units of machinery and 6 million tons less food. Borton could produce 6 million more tons of food and, given that their opportunity cost of a million tons of food is 1/5 of a million units of machinery, produce 1.2 million fewer units of machinery.
- When each country specializes in the good for which they have a comparative advantage and trades with the other, there are clear gains in our example. Total food production can remain at 16 million tons while the total output of machinery is increased by 0.8 million units. Alton will export machinery, since they are the low (opportunity) cost producer of machinery, and import food from Borton. Borton has a comparative advantage in the production of food and will export food to Alton and import Alton-produced machinery

R20 Ricardian Model

- In the *Ricardian model*, labor is the only (variable) factor of production. Differences in labor productivity, reflecting underlying differences in technology, are the source of comparative advantage and hence the key driver of trade in this model.
- In the two-country model, if countries vary in size, the smaller country may specialize completely, but may not be able to meet the total demand for the product.
 - The larger country may be incompletely specialized, producing and exporting the good in which it has a comparative advantage but still producing (and consuming) some of the good in which it has a comparative disadvantage.
 - It is important to recognize that although differences in technology may be a major source of comparative advantage at a given point in time, other countries can close the technology gap or even gain a technological advantage.

R20 Heckscher-Ohlin Model

- In the *Heckscher—Ohlin Model* (also known as the factor-proportions theory), both capital and labor are variable factors of production.
 - Differences in the relative endowment of these factors are the source of a country's comparative advantage.
 - A country has a comparative advantage in goods whose production is intensive in the factor with which it is relatively abundantly endowed, and would tend to specialize in and export that good.
 - ✓ Capital is relatively more (less) abundant in a country if the ratio of its endowment of capital to labor is greater (less) than that of its trading partner.
 - ✓ A country having relatively abundant labor would export relatively labor-intensive goods and import relatively capital-intensive goods.
 - It allows the possibility of income redistribution through trade.
 - ✓ The price of the relatively less scarce (more available) factor of production in each country will increase.
 - ✓ The good that a country imports will fall in price (that is why they import it), and the good that a country exports will rise in price.

R20 Reasons for Trade Restrictions

- **Infant industry:** Protection from foreign competition is given to new industries to give them an opportunity to grow to an internationally competitive scale and get up the learning curve in terms of efficient production methods.
- **National security:** Protect producers of goods crucial to the country's national defense so that those goods are available domestically in the event of conflict.
- **Protecting domestic jobs:** While some jobs are certainly lost, and groups and regions are negatively affected by import restrictions, other jobs (in export industries or growing domestic goods and services industries) will be created, and prices for domestic consumers will be less without import restrictions.
- **Protecting domestic industries:** Industry firms often use political influence to get protection from foreign competition, usually to the detriment of consumers, who pay higher prices
- Other arguments for trade restrictions:
 - Retaliation for foreign trade restrictions
 - Government collection of tariffs (like taxes on imported goods)
 - Countering the effects of government subsidies paid to foreign producers
 - Preventing foreign exports at less than their cost of production (dumping)

R20 Types of Trade Restrictions

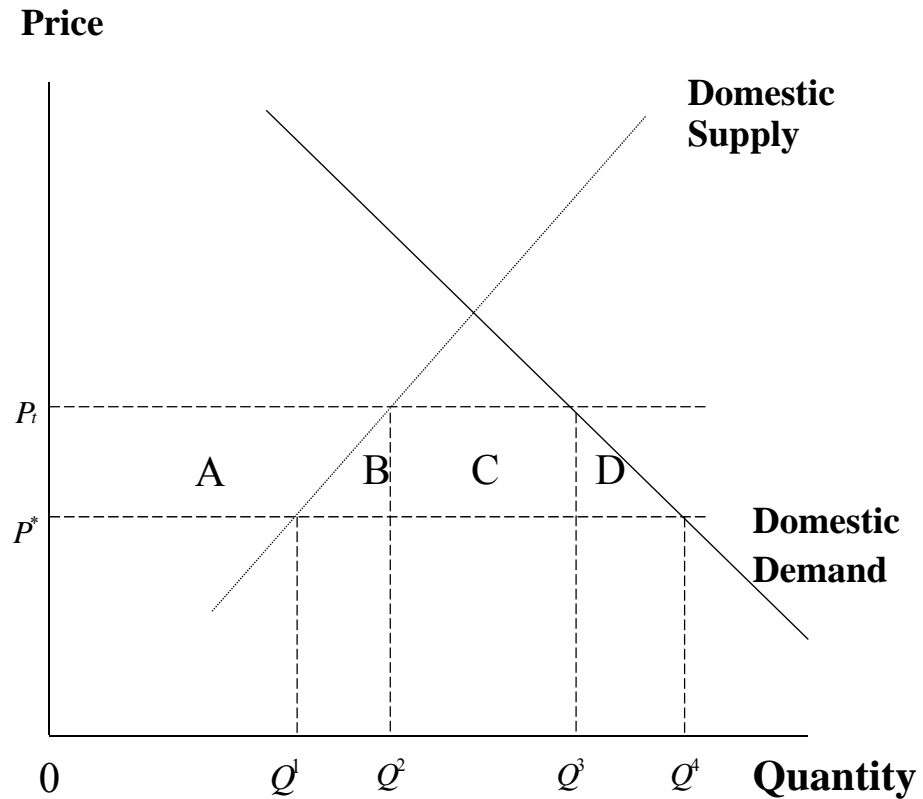
➤ Types of trade restrictions include:

- **Tariffs**: taxes on imported good collected by the government.
- **Quotas**: limits on the amount of imports allowed over some period.
- **Export subsidies**: government payments to firms that exports goods.
- **Minimum domestic content**: requirement that some percentage of product content must be from the domestic country.
- **Voluntary export restraint**: a country voluntarily restricts the amount of a good that can be exported, often in the hope of avoiding tariffs or quotas imposed by their trading partner.

Tariffs and Quotas

- **Tariff** placed on small country by increasing their price above the free trade price. And also decreases the quantity imported, and increases the quantity supplied domestically.
- The net welfare effect is the sum of the three effects as follows:
 - Domestic producers gain,
 - Foreign exporters lose,
 - And the domestic government gains by the amount of the tariff revenues.
 - The loss in consumer surplus is greater than the sum of gain in producer surplus and government revenue
- **Quota** restricts the quantity of a good imported to the quota amount.
- The analysis of quotas is the same as tariff.

R20 Welfare Effects of an Import Tariff or Quota



	Importing Country
Consumer surplus	$-(A+B+C+D)$
Producer surplus	$+A$
Tariff revenue or Quota rents	$+C$
National welfare	$-B-D$

R20 Possible effects of Tariffs and Quotas on large and small countries

- “Small” is not in size, population, or GDP. A small country is a price taker in the world market
 - For example, Brazil is a large country, but it's a price taker in car market
- A large country (large importer) can influence world price. In theory large country may increase its welfare by imposing tariff.
 - When large country imposes a tariff, the exporter reduce price to retain market share it could lose if it did not lower its price.
 - Price reduction alters the terms of trade (price of exports to price of imports) and represents a redistribution of income from exporting country to the importing country.
 - Based on assumptions:
 - ✓ Trading partner does not retaliate
 - ✓ DWL resulting from the tariff is smaller than the benefit of improving its terms of trade.
- The analysis of quotas is the same as tariff.

R20 Export subsidies

- The goal of export subsidy is to stimulate exports. But it interferes with the functioning of the free market and may distort trade away from comparative advantage, thus reduces welfare. Countervailing duties (反补贴税) are the example of export subsidy.
 - Exporter has the incentive to shift sales from domestic to export market because it receives world price plus the per-unit subsidy for each unit exported.
 - Subsidies lead to decrease in welfare:
 - ✓ In small country case, price rises in domestic market by the amount of subsidy.
 - ✓ In large country case, world price declines as the large country increases exports.
 - ✓ In both small and large country case, the net welfare will decrease, but with a larger decline in large country case. Because in large country case, the decline in world price implies that a part of subsidy is transferred to the foreign country (Importer), unlike the small country case.

R20 Voluntary Export Restraint and Export Subsidies

- *Voluntary export restraint (VER)* refers to a voluntary agreement by a government to limit the quantity of a good that can be exported.
 - It results in a welfare loss to the importing country equal to that of an equivalent quota with no government charge for the import licenses; that is, no capture of the quota rents.
- Effects of import quotas, tariffs, and VERs, with respect to the domestic (importing) country:
 - Reduce imports
 - Increase price
 - Decrease consumer surplus
 - Increase domestic quantity supplied
 - Increase producer surplus

R20 Effects of Trade Restrictions

Effects of Trade Restrictions

	Tariff	Import Quota	Export Subsidy	VER
Impact on	Importing country	Importing country	Exporting country	Importing country
<i>Producer surplus</i>	Increases	Increases	Increases	Increases
<i>Consumer surplus</i>	Decreases	Decreases	Decreases	Decreases
Government revenue	Increases	Mixed (depends on whether the quota rents are captured by the importing country through sale of licenses or by the exporters)	Falls (government spending rises)	No change (rent to foreigners)
National welfare	Decreases in Small country	Decreases in small country	Decreases (a larger decline in large country)	Decreases
	Could increase in large country	Could increase in large country		

R20 Effects of Trade Restrictions

Effects of Trade Restrictions

	Tariff	Import Quota	Export Subsidy	VER
Impact on	Importing country	Importing country	Exporting country	Importing country
<i>Price</i>	Increases	Increases	Increases	Increases
<i>Domestic consumption</i>	Decreases	Decreases	Decreases	Decreases
<i>Domestic production</i>	Increases	Increases	Increases	Increases
Trade	Imports decrease	Imports decrease	Exports increase	Imports decrease

R20 Capital Restrictions

- Some countries impose capital restrictions on the flow of financial capital across borders.
- Restrictions include:
 - Outright prohibition of investment in the domestic country by foreigners
 - Prohibition of or taxes on the income earned on foreign investments by domestic citizens
 - Prohibition of foreign investment in certain domestic industries
 - Restrictions on repatriation of earnings of foreign entities operating in a country
- Overall, capital restrictions are thought to decrease economic welfare.
 - However, over the short term, they have helped developing countries avoid the impact of great inflows of foreign capital during periods of optimistic expansion and the impact of large outflows of foreign capital during periods of correction and market unease or outright panic.
 - Even these short-term benefits may not offset longer-term costs if the country is excluded from international markets for financial capital flows.

R20 Reductions in Trade Restrictions

- Positive effects:
 - Increase trade according to comparative advantage
 - Increase competition among firms in member countries
- Negative effects:
 - Some firms, some industries, and some groups of workers will see their wealth and incomes decrease
 - Workers in affected industries may need to learn new skills to get new jobs
- On balance, economic welfare is improved by reducing or eliminating trade restrictions.
 - To the extent that a trade agreement increase trade restrictions on imports from non-member countries, economic welfare gains are reduced and, in an extreme case, could be outweighed by the costs such restrictions imposes.
 - This could result if restrictions on trade with non-member countries increases a country's (unrestricted) imports from a member that has higher prices than the country's previous imports from a non-member.

R20 Trading Blocs, Common Markets and Economic Unions

➤ Free trade areas

- All barriers to import and export of goods and services among member countries are removed.

➤ Customs union

- Same as free trade areas, and
- All countries adopt a common set of trade restrictions with non-members.

➤ Common market

- Same as customs union, and
- All barriers to the movement of labor and capital goods among member countries are removed.

➤ Economic union

- Same as common market, and
- Member countries establish common institutions and economic policy for the union.

➤ Monetary union

- Same as economic union, and
- Member countries adopt a single currency.

R20 Example: Trading Blocs

➤ **Example:**

1. Chile and Australia have free trade with each other but have separate trade barriers on imports from other countries. Chile and Australia are a part of a (n)

A. FTA.

B. Economic union.

C. Customs union.

D. Common market.

2. An RTA that removes all tariffs on imports from member countries, has common external tariffs against all non-members, but does not advance further in deepening economic integration is called a (n)

A. FTA.

B. Economic union.

C. Customs union.

D. Common market.

➤ **Solution:**

Solution to 1: A is correct. Chile and Australia do not have a customs union because they do not have 'a common trade policy with respect to other trade partners (C is incorrect). A common market or an economic union entail even more integration (B and D are incorrect).

Solution to 2: C is correct. A basic FTA does not entail common external tariffs (A is incorrect), whereas a common market and an economic union entail integration beyond common external tariffs (B and D are incorrect).

R20 Balance of Payments (BOP)

- ***Balance of payments (BOP)*** is a double-entry bookkeeping system that summarizes a country's economic transactions with the rest of the world for a particular period of time, typically a calendar quarter or year.
- Every transaction involves both a debit and credit.
 - In principle, the sum of all debit entries should equal the sum of all credit entries, and the net balance of all entries on the BOP statement should equal zero.
 - In practice, however, this is rarely the case because the data used to record balance of payments transactions are often derived from different sources.

Debits	Credits
Increase in assets, decrease in liabilities	Decrease in assets, increase in Liabilities
Value of imported goods and services	Payments for imports of goods and services
Purchases of foreign financial assets	Payments for foreign financial assets
Receipt of payments from foreigners	Value of exported goods and services
Increase in debt owed by foreigners	Payment of debt by foreigners
Payment of debt owed to foreigners	Increase in debt owed to foreigners

R20 BOP Components

- **Current account** measures the flows of goods and services.
 - **Merchandise and services**
 - ✓ Merchandise consists of all raw materials and manufactured goods bought, sold, or given away.
 - ✓ Services include tourism, transportation, and business and engineering services, as well as fees from patents and copyrights on new technology, software, books, and movies.
 - **Income receipts** include foreign income from dividend on stock holdings and interest on debt securities
 - **Unilateral transfers** are one-way transfers of assets, such as money received from those working abroad and direct foreign aid.

R20 BOP Components

- **Capital account** consists of capital transfers and the acquisition and disposal of non-produced, non-financial assets.
 - **Capital transfers**
 - ✓ Debt forgiveness and goods and financial assets that migrants bring when they come to a country or take with them when they leave.
 - ✓ The transfer of title to fixed assets and of funds linked to the purchase or sale of fixed assets, gift and inheritance taxes, death duties, and uninsured damage to fixed assets.
 - **Sales and purchases of non-financial assets** that are not produced assets include rights to natural resources and intangible assets, such as patents, copyrights, trademarks, franchises, and leases.
- **Financial account** records investment flows.
 - **Government-owned assets abroad** include gold, foreign currencies, foreign securities, reserve position in the IMF, credits and other long-term assets, direct foreign investment, and claims against foreign banks.
 - **Foreign-owned assets in the country** are divided into foreign official assets and other foreign assets in the domestic country. These assets include domestic government and corporate securities, direct investment in the domestic country, domestic country currency, and domestic liabilities to foreigners reported by domestic banks.

R20 Decisions by Consumers, Firms, and Governments Influence the BOP

- Relation between the trade deficit, saving, and domestic investment:

$$\underline{X-M = \text{private savings} + \text{government savings} - \text{investment}}$$

- Lower levels of private saving, larger government deficits, and high rates of domestic investment all tend to result in or increase a current account deficit.
 - Low private or government savings in relation to private investment in domestic capital requires foreign investment in domestic capital.
 - Borrowing from foreign countries to finance high consumption (low savings) increase the domestic country's liabilities without any increase to its future productive power.
 - Borrowing from foreign countries to finance a high level of private investment in domestic capital, the added liability is accompanied by an increase in future productive power because of the investment in capital.

R20 International Monetary Fund (IMF)

➤ International Monetary Fund (IMF):

- Provides a forum for cooperation on international monetary problems
- Facilitates the growth of international trade and promotes employment, economic growth, and poverty reduction
- Supports exchange rate stability and an open system of international payments
- Lends foreign exchange to members when needed, on a temporary basis and under adequate safeguards, to help them address balance of payments problems.

➤ After the global financial crisis of 2007-2009, the IMF has redefined and deepened its operations by:

- Enhancing its lending facilities
- Improving the monitoring of global, regional, and country economies
- Helping resolve global economic imbalances
- Analyzing capital market developments
- Assessing financial sector vulnerabilities

R20 World Bank Group

- *World Bank Group's* main objective is to help developing countries fight poverty and enhance environmentally sound economic growth. For developing countries to grow and attract business, they have to
- Strengthen their governments and educate their government officials
 - Implement legal and judicial systems that encourage business
 - Protect individual and property rights and honor contracts
 - Develop financial systems robust enough to support endeavors ranging from micro credit to financing larger corporate ventures
 - Combat corruption

R20 World Trade Organization (WTO)

➤ World Trade Organization (WTO):

- The only international organization dealing with the global rules of trade between nations
- Its main function is to ensure that trade flows as smoothly, predictably and freely as possible.
- Trade friction is channeled into the WTO's dispute settlement process where the focus is on interpreting agreements and commitments, and how to ensure that countries' trade policies conform with them.
- At the heart of the system – known as the multilateral trading system – are the WTO's agreements, negotiated and signed by a large majority of the world's trading nations, and ratified in their parliaments.
- They also bind governments to keep their trade policies within agreed limits to everybody's benefit.

Framework of Economics

➤ SS 4 Microeconomic Analysis

- R13 demand and supply: introduction
- R14 demand and supply: consumer demand introduction
- R15 demand and supply: the firm
- R16 the firm and the market structure

➤ SS 5 Macroeconomic Analysis

- R17 aggregate output, price, and economic growth
- R18 understand business cycles
- R19 monetary and fiscal Policy

➤ SS 6 Economics in a Global Context

- R20 international trade and capital flow
- R21 currency exchange rate

R21 Currency Exchange Rate

- Foreign exchange rate
- Spot and forward rate
- Interest rate parity
- Exchange rate regimes
- Changes in exchange rate affect the balance of trade

R21 Nominal and Real Exchange Rate

- Exchange rate is simply the price or cost of units of one currency in terms of another.
- Nominal exchange rate: the price that we observe in the marketplace for foreign exchange.
- Real exchange rate: the focus shifts from the quotations in the foreign exchange market to what the currencies actually purchase in terms of real goods and services.
 - $\text{FX real}(d/f) = \text{FX nominal}(d/f) * \text{CPI}_f / \text{CPI}_d$
 - Changes in real exchange rates can be used *when analyzing economic changes over time*.
 - ✓ When the real exchange rate (d/f) increases, exports of goods and services have gotten relatively less expensive to foreigners, and imports of goods and services from the foreign country have gotten relatively more expensive over time
- **Example:** At a base period, the CPI of the U.S. and U.K. are both 100, and the exchange rate is \$1.70 per euro. Three years later, the exchange rate is \$1.60 per euro, and the CPI has risen to 110 in the U.S. and 112 in the U.K.. What is the real exchange rate?
- **Solution:** The real exchange rate is $\$1.60 \text{ per euro} * 112/110 = \1.629 per euro .

R21 Spot Rates and Forward Rates

- **Spot rates** are exchange rates for immediate delivery of the currency.
 - **Spot markets** refer to transactions that call for immediate delivery of the currency. In practice, the settlement period is two business days after the trade date.
- **Forward rates** are exchange rates for currency transactions that will occur in the future.
 - **Forward markets** are for an exchange of currencies that will occur in the futures. Both parties to the transaction agree to exchange one currency for another at a specific future date.

R21 Participants in the Foreign Markets

- **Sell side**: large multinational banks
- **Buy side**:
 - **Corporations**: regularly engage in cross-border transactions, purchase and sell foreign currencies as a result, and enter into FX forward contracts to hedge the risk of expected future receipts and payments denominated in foreign currencies.
 - **Investment accounts**: hold foreign securities, and may both speculate and hedge with currency derivatives
 - ✓ **real money accounts**: refer to mutual funds, pension funds, insurance companies, and other institutional accounts that do not use derivatives
 - ✓ **leveraged accounts**: refer to the various types of investment firms that do use derivatives, including hedge funds, firms that trade for their own accounts, and other trading firms of various types.
 - **Governments and government entities**: including sovereign wealth funds and pension funds, acquire foreign exchange for transactional needs, investment, or speculation.
 - ✓ **Central bank** sometimes engage in FX transactions to affect exchange rates in the short term in accordance with government policy.
 - **Retail market**: refers to FX transactions by households and relatively small institutions and may be for tourism, cross-border investment, or speculative trading.

R21 Indirect and Direct Foreign Exchange Quotations

- **Direct quote** is the value of one unit of a foreign currency in units of the home currency. (D/F)
- **Indirect quote** is the amount of a foreign currency for one unit of the home currency. (F/D)
- **Base currency**: the currency in which the quote represents one unit
- **Price currency**: the currency for which the quote represents a number of units
 - The foreign currency is the base currency for a direct quote.
 - The home currency is the base currency for an indirect quote.
- To convert an indirect quote to a direct quote, you simply take the reciprocal of the one that you are given (use the 1/x calculator key).
 - AUD: USD=0.6 , 0.6USD/AUD , 1AUD=0.6USD
 - USD: AUD=1/0.6=1.67 , 1.67AUD/USD

R21 Percentage Change in a Currency Relative to another Currency

- As a rule of thumb, calculate the percentage change in the value of a currency using direct quotes for that currency in terms of the other.
- Consider a USD/EUR exchange rate that has changed from 1.42 to 1.39 USD/EUR.
 - The percentage change in the USD price of a euro is $1.39/1.42 - 1 = -0.0211 = -2.11\%$.
 - Because the USD price of a euro has fallen, the euro has depreciated relative to the dollar, and a euro now buys 2.11% fewer U.S. dollars.
 - It is correct to say that the EUR has depreciated by 2.111% relative to the USD.
 - It is not correct to say that the USD has appreciated by 2.11%.
- Calculate the percentage appreciation of the USD, firstly convert the quotes to EUR/USD, $1/1.42 \text{ USD/EUR} = 0.7042 \text{ EUR/USD}$, and $1/1.39 \text{ USD / EUR} = 0.7194 \text{ EUR/USD}$.
 - Use these exchange rates to calculate the change in the euro price of a USD as $0.7194/0.7042 - 1 = 0.0216 = 2.16\%$.
 - It is correct to say that the USD has appreciated 2.16% with respect to the EUR.

R21 Cross Rate

➤ **Cross rate** is the exchange rate between two currencies implied by their exchange rates with a common third country.

➤ **Example:**

- $\text{USD/AUD} = 0.60, \text{MXN/USD} = 10.70$

- ✓ $\text{MXN/AUD} = \text{USD/AUD} * \text{MXN/USD} = 0.60 * 10.70 = 6.42$

- $\text{CHF/USD} = 1.7799, \text{NZD/USD} = 2.2529$

- ✓ $\text{CHF/NZD} = (\text{CHF/USD}) / (\text{NZD/USD}) = 1.7799 / 2.2529 = 0.7900$

R21 Forward Discount or Premium

➤ Forward discount or premium

- With the convention of giving the value of the quoted currency (the first currency) in terms of units of the second currency, there is a premium on the quoted currency when the forward exchange rate is higher than the spot rate and a discount otherwise.

➤ Forward exchange rates in points

- The AUD/EUR spot exchange rate is 0.7313 with the 1-year forward rate quoted at +3.5 points.
 - ✓ What is the 1-year forward AUD/EUR exchange rate?
 - ✓ Is the euro trading at a forward discount or forward premium relative to the Australian dollar?
- Solution:
 - ✓ The forward exchange rate is $0.7313 + 0.00035 = 0.73165$.
 - ✓ Because the price of euros in AUD is higher one year out, the euro is trading at a forward premium (and the AUD at forward discount).

R21 Forward Discount or Premium

➤ Forward exchange rates in percentage

- The AUD/EUR spot rate=0.7313, and the one year forward exchange rate is given as -0.062%
- The one year forward rate= $0.7313 (1 - 0.00062) = 0.7308$
- Because the price of euros is less in AUD, the AUD is trading at forward premium.

R21 Interest Rate Parity (IRP)

- Interest rate parity (IRP) holds when any forward premium or discount just offsets differences in interest rates so that an investor will earn the same return investing in either currency. Approximated by equating the difference between the domestic interest rate and the foreign interest rate to the forward premium or discount.
- Interest rate parity relationship:
 - F (forward), S (spot) X/Y, r_X and r_Y is the nominal risk-free rate in X and Y
 - $$\frac{F}{S} = \frac{1 + r_X}{1 + r_Y}$$
 - $$\frac{F - S}{S} = \frac{1 + r_X}{1 + r_Y} - 1 = \frac{r_X - r_Y}{1 + r_Y} \approx r_X - r_Y$$
- The forward rate will be higher than (be at a premium to) the spot rate if the nominal risk-free rate in X is higher than that in Y.
- More generally, and regardless of the quoting convention, the currency with the higher (lower) interest rate will always trade at a discount (premium) the forward market.

R21 Covered Interest Arbitrage

- Covered interest arbitrage is a trading strategy that exploits currency position when the interest rate parity equation is not satisfied.
 - When currencies are freely traded and forward contracts are available in the marketplace, interest rate parity must hold.
 - If it does not hold, arbitrage trading will take place until interest rate parity holds with respect to the forward exchange rate.
- You can check for an arbitrage opportunity by using the covered interest differential, which says that the domestic interest rate should be the same as the hedged foreign interest rate.

$$(1+r_x) - \left(\frac{(1+r_Y) \times F}{S} \right) = \text{covered interest differential}$$

- The difference between the domestic interest rate and the hedged foreign interest rate (covered interest differential) should be zero.

R21 Summary for Arbitrage

$$\text{If } \frac{F}{S} > \frac{1+r_X}{1+r_Y}, \frac{F}{S} \times (1+r_Y) > 1+r_X,$$

then borrow X currency, the profit margin will be $\frac{F}{S} \times (1+r_Y) - (1+r_X)$

$$\text{If } \frac{F}{S} < \frac{1+r_X}{1+r_Y}, \frac{S}{F} \times (1+r_X) > 1+r_Y$$

then borrow Y currency, the profit margin will be $\frac{S}{F} \times (1+r_X) - (1+r_Y)$

R21 Currency Exchange Rates

- A currency selling at a forward premium is considered “**strong**” relative to the second currency and is expected to appreciate.
- A currency selling at a forward discount is considered “**weak**” and is expected to depreciate.
- Example
 - $3X/Y$ changes to $2X/Y$
 - $1Y=3X$, now changing to $1Y=2X$
 - Y is weak relatively; X is strong relatively.

R21 Exchange Rate Regimes

➤ Countries That Do Not Have Their Own Currency:

- A country can use the currency of another country (**formal dollarization**) not create money/currency.
- A country can be a member of a **monetary union** in which several countries use a common currency (eg:Euro)

➤ Countries That Have Their Own Currency:

- A currency board arrangement is an explicit commitment to exchange domestic currency for a specified foreign currency at a fixed exchange rate.
 - ✓ A notable example of such an arrangement is Hong Kong. In Hong Kong, currency is (and may be) only issued when fully backed by holdings of an equivalent amount of U.S. dollars. The Hong Kong Monetary Authority can earn interest on its U.S. dollar balances.
- conventional fixed peg arrangement a country pegs its currency within margins of ± 1 percent versus another currency or a basket that includes the currencies of its major trading or financial partners
 - ✓ direct intervention: The monetary authority can maintain exchange rates within the band by purchasing or selling foreign currencies in the foreign exchange market
 - ✓ indirect intervention: including changes in interest rate policy, regulation of foreign exchange transactions, and convincing people to constrain foreign exchange activity

R21 Exchange Rate Regimes

➤ Countries That Have Their Own Currency:

- Target zone : the permitted fluctuations in currency value relative to another currency or basket of currencies are wider (e.g., +/-2 %)
- Crawling peg: the exchange rate is adjusted periodically, typically to adjust for higher inflation
 - ✓ passive crawling peg : a series of exchange rate adjustments over time is announced and implemented
 - ✓ active crawling peg: can influence inflation expectations, adding some predictability to domestic inflation
- Management of exchange rates within crawling bands: the width of the bands that identify permissible exchange rates is increased over time
- Managed floating exchange rates: the monetary authority attempts to influence the exchange rate in response to specific indicators such as the balance of payments, inflation rates, or employment without any specific target exchange rate or predetermined exchange rate path
- Independently floating: the exchange rate is market-determined, and foreign exchange market intervention is used only to slow the rate of change and reduce short-term fluctuations, not to keep exchange rates at a certain target level

R21 Impact of Exchange Rates on Countries' International Trade and Capital Flows

- Exports – imports = (private savings - investment in physical capital) + (tax revenue - government spending)
- or $X - M \equiv (S - I) + (T - G)$
 - Trade surplus: $X - M > 0$
 - ✓ The sum of the excess of private saving over investment plus the government surplus (government saving) must also be positive.
 - ✓ Private savings plus government savings exceed domestic investment in physical capital (plant and equipment).
 - ✓ If $T - G < 0$, private savings (S) must exceed investment (I) by more than the amount of government borrowing. This excess of savings goes to foreign investment, that is, a capital flow into foreign financial assets to offset the trade surplus.
 - Trade deficit, $X - M < 0$
 - ✓ The combination of government savings and private savings will be less than domestic investment.
 - ✓ Therefore, some of that investment must be funded by other countries' purchases of domestic financial asset.

R21 Elasticity Approach

- Two approaches to exam how changes in exchange rates affect the balance of trade:
 - Elasticity approach
 - Absorption approach
- Elasticity approach

$$\omega_M = \frac{\text{Imports}}{\text{imports} + \text{exports}} \quad \omega_X = \frac{\text{exports}}{\text{imports} + \text{exports}}$$

ϵ_M : elasticities (as positive numbers) of demand for imports

ϵ_X : elasticities (as positive numbers) of demand for emports

- Given Marshall-Lerner condition: $\omega_X \epsilon_X + \omega_M (\epsilon_M - 1) > 0$
- When import expenditures=export revenues, $\omega_X = \omega_M \longrightarrow \epsilon_X + \epsilon_M > 1$
 - $\epsilon_X > - (W_M/W_X)(\epsilon_M - 1)$
 - $\epsilon_M > 1 - (W_X/W_M) \epsilon_X$

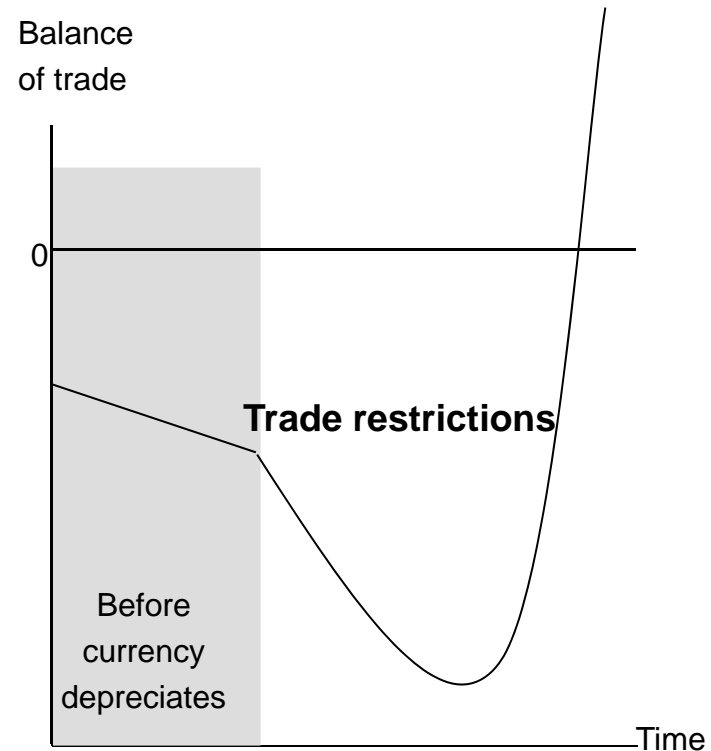
R21 Elasticity Approach

- The *elasticity approach* tells us that currency depreciation will result in a greater improvement in the trade deficit when either import or export demand is elastic.
- Currency depreciation will have a greater effect on the balance of trade when import or export goods are primarily luxury goods, goods with close substitutes, and goods that represent a large proportion of overall spending.
 - Elasticity of demand is greater for goods with close substitutes, goods that represent a high proportion of consumer spending, and luxury goods in general.
 - Goods that are necessities, have few or no good substitutes, or represent a small proportion of overall expenditures tend to have less elastic demand.
- One shortcoming of the elasticity approach is that it only considers trade flows and ignores capital flows, which must also change as a result of a currency depreciation that improves the balance of trade.

R21 J-Curve

➤ The J-Curve

- import and export contracts delivery and payment in the future , import and export quantities may be relatively insensitive to currency depreciation in the short run means currency depreciation may worsen a trade deficit in the short run.
- given the existence of such contracts and the resulting insensitivity of both import and export quantities to currency depreciation, import expenditures may rise in the short run as export prices rise, and export revenues may fall as export prices (in the domestic currency) fall, even when the Marshall-Lerner condition is met.
- This short-term increase in the deficit followed by a decrease when the Marshall-Lerner condition is met.



R21 Absorption Approach

➤ Absorption approach

- $BT = Y - E$
 - ✓ Y = domestic production of goods and services or national income
 - ✓ E = domestic absorption of goods and services, which is total expenditure
 - ✓ BT = balance of trade
- The economy is operating at less than full employment:
 - ✓ Depreciation → price of domestic goods and assets ↓ → expenditures and income ↑ → saving ↑ → trade balance improved
- The economy is operating at full employment:
 - ✓ Depreciation → value of domestic assets ↓ → savers' real wealth ↓ → saving ↑ → wealth ↑ → positive impact on saving ↓ → returning the economy to its previous state and balance of trade

It's not the end but just the beginning.

**Tough Times Never Last,
But Tough People Do !**