Chapter 01 - Limits, Alternatives, and Choices

McConnell Brue Flynn 23e

DISCUSSION QUESTIONS

1. What is an opportunity cost? How does the idea relate to the definition of economics? Which of the following decisions would entail the greater opportunity cost: allocating a square block in the heart of New York City for a surface parking lot or allocating a square block at the edge of a typical suburb for such a lot? Explain. **LO1.1**

   Answer: An opportunity cost is what was sacrificed to do or acquire something else. The condition of scarcity creates opportunity cost. If there was no scarcity, there would be no need to sacrifice one thing to acquire another. The opportunity cost would be much higher in New York City as the alternative uses for that square block are much more valuable than for a typical suburban city block.

2. Cite three examples of recent decisions that you made in which you, at least implicitly, weighed marginal cost and marginal benefit. **LO1.1**

   Answer: Answers will vary, but may include the decision to come to class, to skip breakfast to get a few extra minutes of sleep, to attend college, or to make a purchase. Marginal benefits of attending class may include the acquisition of knowledge, participation in discussion, and better preparation for an upcoming examination. Marginal costs may include lost opportunities for sleep, meals, or studying for other classes. In evaluating the discussion of marginal benefits and marginal costs, be careful to watch for sunk costs offered as a rationale for marginal decisions.

3. What is "utility" and how does it relate to purposeful behavior? **LO1.1**

   Answer: "Utility" refers to the pleasure, happiness, or satisfaction gained from engaging in an activity (eating a meal, attending a ball game, etc.). It is an important component of purposeful behavior because people will allocate their scarce time, energy, and money in an attempt to gain the most utility possible.

4. What are the key elements of the scientific method, and how does this method relate to economic principles and laws? **LO1.2**

   Answer: The key elements include the gathering of data (observation), the formulation of possible explanations (hypothesis), testing the hypothesis, determining the validity of the hypothesis, and repeated testing of the hypothesis that have appeared to be valid in prior tests.

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The scientific method is the technique used by economists to determine economic laws or principles. These laws or principles are formulated to explain and/or predict behavior of individuals or institutions.

5. Make (a) a positive economic statement of your choice, and then (b) a normative economic statement relating to your first statement. **LO1.3**

   Answer: Answers will vary. Example: (a) The unemployment rate is 4.8 percent; (b) the unemployment rate is too high. In general, we treat "what is" statements as positive, "what should be" as normative, but keep an eye out for statements like "at full employment an increase in the production of pizzas *should* come at the cost of less robots." Some students may incorrectly identify the statement as normative because of the term "should."

6. How does the slope of a budget line illustrate opportunity cost and trade-offs? How does a budget line illustrate scarcity and the effect of limited incomes? **LO1.4**

   Answer: Budget lines are always sloped downward. This downward slope shows an inverse relationship between the two goods, meaning that as you increase one, the other must decrease. This decrease is what you are giving up, or the opportunity cost, of the good you are getting more of.

   Budget lines illustrate scarcity in that they show you are limited by your income. Since they slope downward, they show you cannot keep getting more and more of both goods. There is always a trade-off. The area beyond the budget line represents combinations of the goods that are beyond your income.

7. What are economic resources? What categories do economists use to classify them? Why are resources also called factors of production? Why are they called inputs? **L O1.5**

   Answer: Economic resources are the natural, human, and manufactured inputs used to produce goods and services.

   Economic resources fall into four main categories: labor, land (natural resources), real capital (machines, factories, buildings, etc.,) and entrepreneurs.

   Economic resources are also called *factors of production* because they are used to *produce* goods and services. They are called *inputs* because they go *in*to a production process (like ingredients go into a bowl to make a cake), with the resulting goods and services also being referred to as *output*.

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8. Why is money not considered to be a capital resource in economics? Why is entrepreneurial ability considered a category of economic resource, distinct from labor? What roles do entrepreneurs play in the economy? **LO1.5**

   Answer: Money is not considered a capital resource because money is not productive. It provides access to resources but by itself, money does not directly contribute to the production of goods and services. Additionally, the quantity of money in circulation does not determine an economy's productive capacity, while the amount of capital and other resources does. Doubling the amount of money in circulation does not change the economy's physical capacity to produce goods and services. Money is, however, referred as a *financial resource* and as *financial capital*, reflecting its ability to acquire real economic resources.

   Entrepreneurial ability and labor are both human resources, but they perform different functions in the productive process. Entrepreneurial ability does not directly produce goods and services; it organizes the resources that do. Labor refers to the human inputs that directly engage in production.

   Entrepreneurs are risk-takers: they coordinate the activities of the other three inputs for profit—or loss, which is why they are called risk-takers. Entrepreneurs sometimes manage companies that they own, but a manager who is not an owner is not necessarily an entrepreneur but may be performing some of the entrepreneurial functions for the company. Entrepreneurs are also innovators, or perhaps inventors, and profits help to motivate such activities.

9. Explain the typical shapes of marginal-benefit and marginal-cost curves. How are these curves used to determine the optimal allocation of resources to a particular product? If current output is such that marginal cost exceeds marginal benefit, should more or fewer resources be allocated to this product? Explain. **LO1.6**

   Answer: The marginal benefit curve is downward sloping, MB falls as more of a product is consumed because additional units of a good yield less satisfaction than previous units. The marginal cost curve is upward sloping, MC increases as more of a product is produced since additional units require the use of increasingly unsuitable resources. The optimal amount of a particular product occurs where MB equals MC. If MC exceeds MB, fewer resources should be allocated to this use, as the additional cost is more than the additional benefit. The resources are more valuable in some alternative use (as reflected in the higher MC) than in this use (as reflected in the lower MB).

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10. Suppose that, on the basis of a nation's production possibilities curve, an economy must sacrifice 10,000 pizzas domestically to get the 1 additional industrial robot it desires but it can get the robot from another country in exchange for 9,000 pizzas. Relate this information to the following statement: "Through international specialization and trade, a nation can reduce its opportunity cost of obtaining goods and thus 'move outside its production possibilities curve." **LO1.7**

    Answer: The message of the production possibilities curve is that an individual nation is limited to the combinations of output indicated by its production possibilities curve. International specialization means directing domestic resources to output which a nation is highly efficient at producing. International trade involves the exchange of these goods for goods produced abroad. Specialization and trade have the same effect as having more and better resources or discovering improved production techniques. The output gains from greater international specialization and trade are the equivalent of economic growth.

11. **LAST WORD** Studies indicate that married men on average earn more income than unmarried men of the same age and education level. Why must we be cautious in concluding that marriage is the cause and higher income is the effect?

    Answer: Cause and effect are difficult to determine in many instances. Here, it may be possible that the same underlying personality characteristics—such as the ability to get along with people and a commitment to hard work— that lead people to on average earn higher incomes also on average lead them to be more successful in finding mates. Thus, it may not be the case at all that marriage causes higher incomes. Rather, underlying personality characteristics may drive both higher earnings and a greater likelihood of getting married.

REVIEW QUESTIONS

1. Match each term with the correct definition. **LO1.1**

    economics
    opportunity cost
    marginal analysis
    utility

    a. The next-best thing that must be foregone in order to product one more unit of a given product.
    b. The pleasure, happiness, or satisfaction obtained from consuming a good or service.
    c. The social science concerned with how individuals, institutions, and society make optimal (best) choices under conditions of scarcity.
    d. Making choices based on comparing marginal benefits with marginal costs.

    Answer: a. Opportunity cost; b. Utility; c. Economics; d. Marginal analysis

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2. Indicate whether each of the following statements applies to microeconomics or macroeconomics: **LO1.3**
   a. The unemployment rate in the United States was 5.2 percent in August 2021.
   b. A U.S. software firm laid off 15 workers last month and transferred the work to India.
   c. An unexpected freeze in central Florida reduced the citrus crop and caused the price of oranges to rise.
   d. U.S. output, adjusted for inflation, decreased by 3.5 percent in 2020.
   e. Last week Wells Fargo Bank lowered its interest rate on business loans by one-half of 1 percentage point.
   f. The consumer price index rose by 0.3 percent from July 2021 to August 2021.

   Answer: a. Macroeconomics; b. Microeconomics; c. Microeconomics; d. Macroeconomics; e. Microeconomics; f. Macroeconomics

3. Suppose that you initially have $100 to spend on books or movie tickets. The books start off costing $25 each and the movie tickets start off costing $10 each. For each of the following situations, would the attainable set of combinations that you can afford increase or decrease? **LO1.4**
   a. Your budget increases from $100 to $150 while the prices stay the same.
   b. Your budget remains $100, and the price of books remains $25, but the price of movie tickets rises to $20.
   c. Your budget remains $100, and the price of movie tickets remains $10, but the price of a book falls to $15.

   Answer:
   a. **Increase** because a larger budget allows you to purchase not only the combinations that you could afford before but also new combinations that you could not afford before (for example, you can now afford to purchase 4 books and 5 movie tickets);
   b. **Decrease** because certain combinations are no longer affordable (for example, you can no longer purchase 10 movie tickets with your $100 budget);
   c. **Increase** because the lower price allows you to purchase combinations that you could not afford before (for example, you can now purchase 6 books and 1 movie ticket)].
4. Suppose that you are given a $100 budget at work that can be spent only on two items: staplers and pens. If staplers cost $10 each and pens cost $2.50 each, then the opportunity cost of purchasing one stapler is: **LO1.4**
   a. 10 pens.

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b. 5 pens.
c. zero pens.
d. 4 pens.

Answer: 4 pens. You must forego purchasing 4 pens if you are to free up enough money (4 × $2.50 = $10) to purchase a stapler.

5. As economists use the terms, investment is related to capital in that same way that: **LO1.5**
   a. MB is to MC.
   b. practice is to acquiring skill.
   c. color is to sound.
   d. positive economics is to normative economics.

   Answer: The correct answer is b (practice is to acquiring skill) because investment in physical or intangible capital increases a nation's stock of capital in the same way that practice increases a person's level of skill in whatever they choose to practice.

6. For each of the following situations involving marginal cost (MC) and marginal benefit (MB), indicate whether it would be best to produce more, fewer, or the current number of units. **LO1.6**
   a. 3,000 units at which MC = $10 and MB = $13.
   b. 11 units at which MC = $4 and MB = $3.
   c. 43,277 units at which MC = $99 and MB = $99.
   d. 82 units at which MC < MB.
   e. 5 units at which MB < MC.

   Answer:
   a. **More,** because MB > MC, the benefit of consuming one more unit exceed the opportunity costs (scarce resources used elsewhere) of producing that additional unit.
   b. **Fewer,** because MC > MB, the opportunity costs (scarce resources used elsewhere) of producing one more unit exceed the benefit of consuming that additional unit.
   c. **Current number,** because MB = MC, there is no net gain in using scarce resources in producing and consuming one more unit.
   d. **More,** because MB > MC, *see the explanation for part* (**a**)
   e. **Fewer,** because MB < MC, *see the explanation for part* (**b**)
7. Explain how (if at all) each of the following events affects the location of a country's production possibilities curve. **LO1.6**

   a. The quality of education increases.
   b. The number of unemployed workers increases.
   c. A new technique improves the efficiency of extracting copper from ore.
   d. A devastating earthquake destroys numerous production facilities.

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Answer:

a. Assuming better education translates into better work skills, then productivity should increase, and this would shift the curve outward.

b. Should not affect location of curve. Production moves inward, away from the curve.
c. The curve should shift outward as more production is possible with existing resources
d. The curve should shift inward with the destruction of resources (capital).

8. What are the two major ways in which an economy can grow and push out its production possibilities curve? **LO1.7**
   a. Better weather and nicer cars
   b. Higher taxes and lower spending
   c. Increases in resource supplies and advances in technology
   d. Decreases in scarcity and advances in auditing

   Answer: The economy produces output from resource inputs like land, labor, and capital. So one major way for an economy to grow and push out its production possibilities curve is for it to *obtain more resources*. The second major way is to *develop new and better technologies* so that the economy can produce more from any given amount of resources.

9. To obtain greater output, a nation can: **LO1.7**
   a. invest in more goods for the future (capital)
   b. increase the quantity and quality of its resources
   c. engage international specialization and trade
   d. all of the above

   Answer: The correct answer is d, all of the above.

   There are three primary ways by which a country can increase the amount of output that its economy can produce. Over the longer run, it can do so by devoting more if its current output toward increasing its stock of productive capital by investing (rather than consuming) a larger share of its current output. It can also increase its output by increasing the quantity and quality of its resource inputs, since, all other things equal, higher quantities and qualities of resources increase the amount of output a country can produce. Finally, countries can engage in international specialization and trade to obtain greater output by specializing in the production of items that the country can produce at relatively low opportunity costs compared to other countries and then trading for items for which the country in question has relatively high opportunity costs of production.

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PROBLEMS

1. Potatoes cost Janice $1 per pound, and she has $5.00 that she could possibly spend on potatoes or other items. If she feels that the first pound of potatoes is worth $1.50, the second pound is worth $1.14, the third pound is worth $1.05, and all subsequent pounds are worth $0.30 per pound, how many pounds of potatoes will she purchase? How many pounds will she purchase if she has only $2 to spend? **LO1.1**

   Answer: 3; 2

   Feedback: Janice will purchase potatoes until the value of potatoes is less than the cost of potatoes or until her income has been exhausted. For example, assume Janice has $5.00 to spend on potatoes or other items and the cost of a pound of potatoes is $1. Now assume the first pound of potatoes is worth $1.50 to Janice. She will purchase this pound of potatoes, since the value of the pound of potatoes ($1.50) is greater than the cost ($1). If the second pound is worth $1.14 and the third pound is worth a $1.05, then Janice will purchase these as well since the value exceeds the cost of $1. If all remaining pounds are worth $0.30, then Janice will not purchase these because the value is less than the cost. Thus, Janice will purchase 3 pounds of potatoes at total cost of $3.00.

   Now assume Janice only has $2.00 to spend on potatoes. She will purchase the first pound because it is worth $1.50 to her and it only costs a $1. She will purchase the second pound because it is worth $1.14. She has now spent her entire income on potatoes. She would like to purchase the third pound because the value of this pound of potatoes is $1.05, but she does not have the income to make this purchase. Thus, Janice will purchase 2 pounds of potatoes at a total cost of $2.00.

2. Pham can work as many or as few hours as she wants at the college bookstore for $12 per hour. But due to her hectic schedule, she has just 15 hours per week that she can spend working at either the bookstore or at other potential jobs. One potential job, at a café, will pay her $15 per hour for up to 6 hours per week. She has another job offer at a garage that will pay her $13 an hour for up to 5 hours per week. And she has a potential job at a daycare center that will pay her $11.50 per hour for as many hours as she can work. If her goal is to maximize the amount of money she can make each week, how many hours will she work at the bookstore? **LO1.1**

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Answer: 4.

Feedback: Pham will choose to work at the bookstore as long as the wage rate at the bookstore exceeds her other opportunities. However, if another job offers a higher wage rate, she will choose employment there. She will work until her total time allotment (for work) is exhausted.
She will choose to work at the café for the full 6 hours because the wage rate at the café is $15 per hour, which is greater than the wage rate at the bookstore of $12. This leaves her with 9 hours of work time remaining. Next, she will choose to work at the garage for the full 5 hours because the wage rate here is $13, which again is greater than the bookstore wage rate $12. After this decision, she only has 4 hours of work time remaining. She will choose to work these last 4 hours at the bookstore because the bookstore wage rate of $12 exceeds the daycare center wage rate of $11.50.

3. Suppose you won $15 on a lotto ticket at the local 7-Eleven and decided to spend all the winnings on candy bars and bags of peanuts. Candy bars cost $0.75 each while bags of peanuts cost $1.50 each. **LO1.4**
   a. Construct a table showing the alternative combinations of the two products that are available.
   b. Plot the data in your table as a budget line in a graph. What is the slope of the budget line? What is the opportunity cost of one more candy bar? Of one more bag of peanuts? Do these opportunity costs rise, fall, or remain constant as additional units are purchased?
   c. Does the budget line tell you which of the available combinations of candy bars and bags of peanuts to buy?
   d. Suppose that you had won $30 on your ticket, not $15. Show the $30 budget line in your diagram. Has the number of available combinations increased or decreased?

Answers:
Part a:

Alternative Combinations

Goods	A	B	C	D	E	F
Candy bars	0	4	8	12	16	20
Bags of peanuts	10	8	6	4	2	0

Part b:

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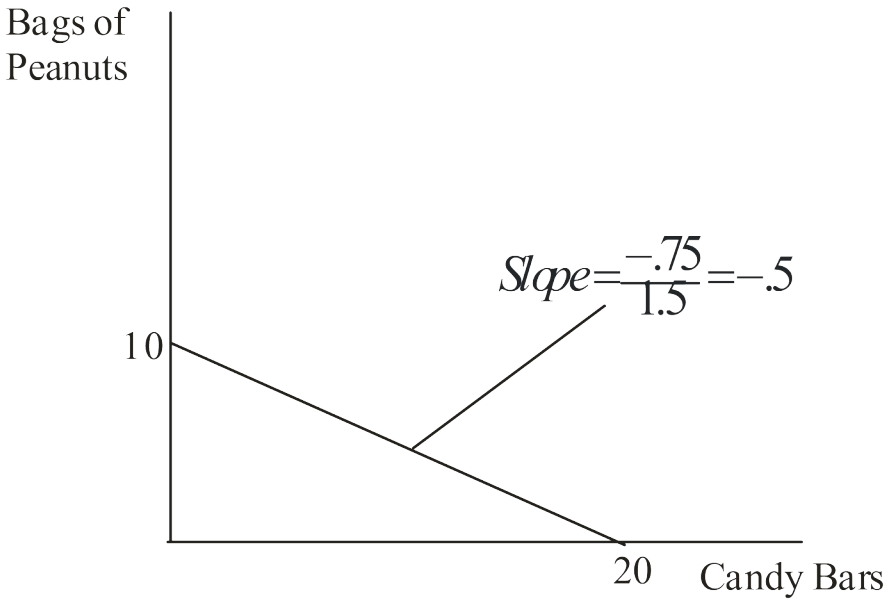

Feedback: The slope for the budget line, with candy bars on the horizontal axis, is −0.5 (= $-P_{cb}/P_{bp}$) The opportunity cost of one candy bar is 0.5 bags of peanuts. Note that the figure could also be drawn with bags of peanuts on the horizontal axis. The slope of that budget line would be −2. The opportunity cost of one more candy bar is ½ of a bag of peanuts. The opportunity cost of one more bag of peanuts is 2 candy bars. These opportunity costs are constant. They can be found by comparing any two of the consumption alternatives for the two goods.

Part c: No; it only tells you what is possible.

Feedback: The budget line does not tell you which of the available combinations of candy bars and bags of peanuts to buy. You will need to use your preference relationship for candy bars and bags of peanuts to determine which combination to buy. The budget line only tells you which combinations are feasible.

Part d: Increased.

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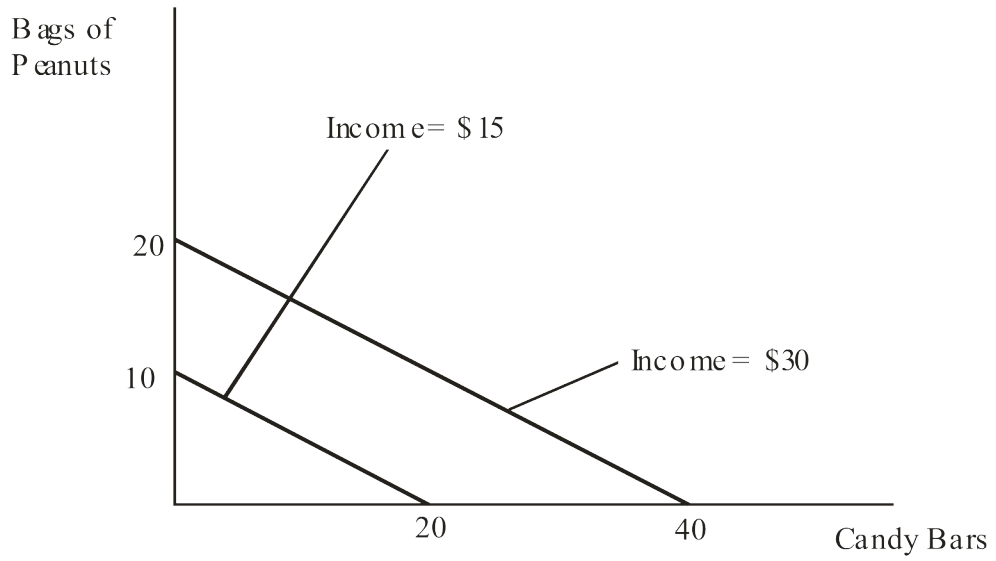

Feedback: The budget line at $30 would be preferable because it would allow greater consumption of both goods.

4. Suppose that you are on a desert island and possess exactly 20 coconuts. Your neighbor, Friday, is a fisherman, and he is willing to trade 2 fish for every 1 coconut that you are willing to give him. Another neighbor, Kwame, is also a fisherman, and he is willing to trade 3 fish for every 1 coconut. **LO1.5**
   a. On a single figure, draw budget lines for trading with Friday and for trading with Kwame. (Put coconuts on the vertical axis.)
   b. What is the slope of the budget line from trading with Friday?
   c. What is the slope of the budget line from trading with Kwame?
   d. Which budget line features a larger set of attainable combinations of coconuts and fish?
   e. If you are going to trade coconuts for fish, would you rather trade with Friday or Kwame? Why?

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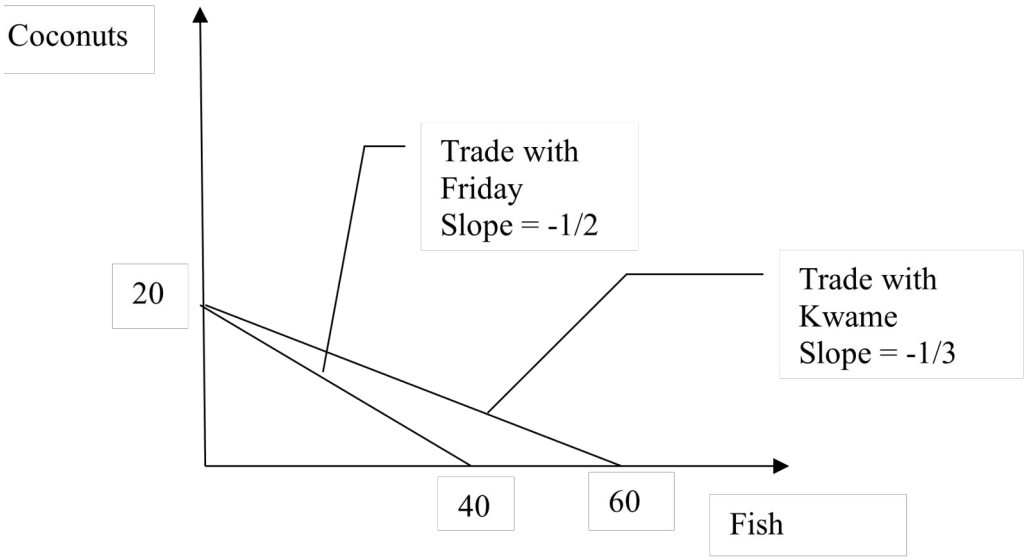
Answers:

Part a:



Part b: −1/2

Feedback: The slope of the budget line from trading with Friday equals −(1/2). This implies that for every coconut you give up, Friday must give up two fish. Or, for every fish that Friday gives up, you must give up (1/2) a coconut.

Part c: −1/3

Feedback: The slope of the budget line from trading with Kwame equals −(1/3). This implies that for every coconut you give up, Kwame must give up three fish. Or, for every fish that Friday gives up, you must give up (1/3) a coconut.

Part d: The budget line from trading with Kwame

Feedback: The budget line from trading with Kwame features a larger set of attainable combinations of coconuts and fish. Because Kwame is willing to give up more fish per coconut, you can consume more of both (assuming you make a trade). This implies that you would prefer to trade with Kwame.

Part e: Kwame

Feedback: Because Kwame is willing to give up more fish per coconut, you can consume more of both (assuming you make a trade). This implies that you would prefer to trade with Kwame.

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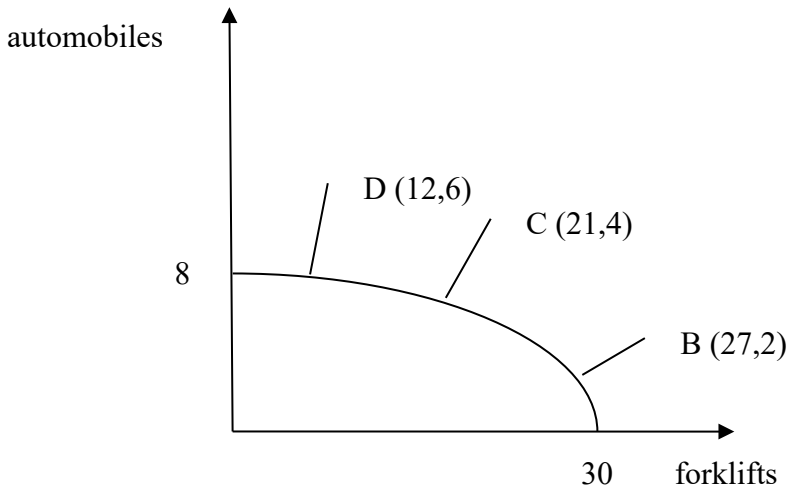
5. Refer to the following production possibilities table for consumer goods (automobiles) and capital goods (forklifts): **LO1.6**

	Production Alternatives				
Type of Production	A	B	C	D	E
Automobiles	0	2	4	6	8
Forklifts	30	27	21	12	0

   a. Show these data graphically. Upon what specific assumptions is this production possibilities curve based?
   b. If the economy is at point C, what is the cost of one more automobile? Of one more forklift? Which characteristic of the production possibilities curve reflects the law of increasing opportunity costs: its shape or its length?
   c. If the economy characterized by this production possibilities table and curve is producing 3 automobiles and 20 forklifts, what could you conclude about its use of its available resources?
   d. Is production at a point outside the production possibilities curve currently possible? Could a future advance in technology allow production beyond the current production possibilities curve? Could international trade allow a country to consume beyond its current production possibilities curve?

   Answers:

   Part a: (See figure below.) The assumptions are full employment, fixed supplies of resources, fixed technology and two goods.



   Part b: 4 automobiles and 21 forklifts; its shape.

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Feedback: Consider the following example:

	Production Alternatives				
Type of Production	A	B	C	D	E
Automobiles	0	2	4	6	8
Forklifts	30	27	21	12	0

Assume the economy is producing at point C. Thus, the economy is producing 4 automobiles and 21 forklifts.

The cost of producing 2 more automobiles (4 automobiles to 6 automobiles) can be found by moving to point D and calculating the number of forklifts given up for the 2 additional automobiles. At point D, the economy is producing 12 forklifts, which is a loss of 9 forklifts (moving from C to D) for the 2 additional automobiles.

The cost of producing one more forklift can be found in an equivalent fashion. First, we will move to point B (from point C). Here we must give up 2 automobiles to get 6 forklifts.

Increasing opportunity cost implies that we must give up more of a particular good to get an additional unit of a different good. This implies as we move along the production possibilities curve (from left to right) we must give up more automobiles to get an additional forklift. Thus, the shape of the schedule captures the increasing opportunity cost concept.

Part c: Underutilizing.

Feedback: The economy is underutilizing resources (inside the PPC).

Part d: No; Yes; Yes.

Feedback: No, the country cannot produce outside its PPC. Yes, a technological advance would shift the PPC outward allowing the country produce more with a given amount of inputs. Yes, a technological advance would shift the PPC outward, allowing the country to produce more with a given amount of inputs. Yes, by specializing in goods, we have a comparative advantage producing, so we can trade to gain access to goods beyond our own PPC.

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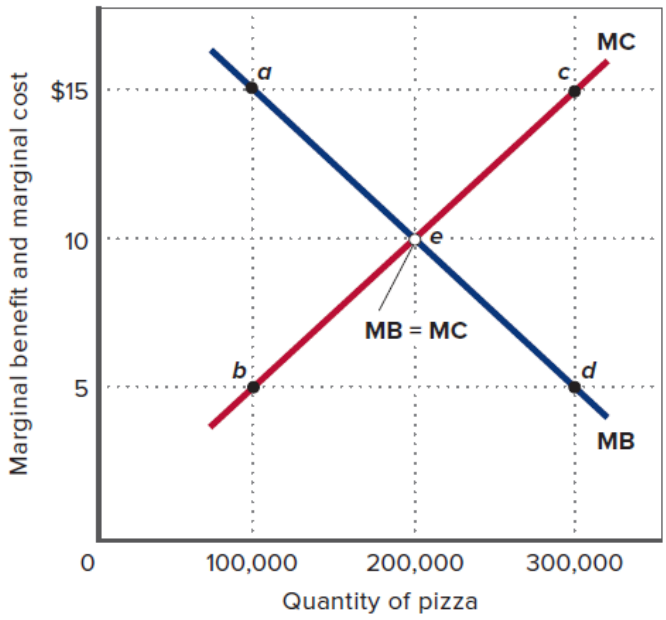
6. Refer to the following figure. Suppose that the cost of cheese falls, so that the marginal cost of producing pizza decreases. Will the MC curve shift up or down? Will the optimal amount of pizza increase or decrease? Explain. **LO1.6**



Answers: MC will shift down; the optimal amount of pizza will increase.

Feedback: To think about cost schedules, we must think about input costs. If the cost of cheese falls, then the cost of making pizza is cheaper for all pizzas. This implies that the marginal cost schedule will shift down, reflecting the lower input cost. For a given marginal benefit, the optimal amount of pizza produced and sold will increase. Thus, the equilibrium price will fall. The opposite story would apply if the cost of cheese were to increase.

7. Referring to the table in problem 5, suppose improvement occurs in the technology of producing forklifts but not in the technology of producing automobiles. Draw the new production possibilities curve. Now assume that a technological advance occurs in producing automobiles but not in producing forklifts. Draw the new production possibilities curve. Now draw a production possibilities curve that reflects technological improvement in the production of both goods. **LO1.7**

	Production Alternatives				
Type of Production	A	B	C	D	E
Automobiles	0	2	4	6	8
Forklifts	30	27	21	12	0

Answers: See figures.

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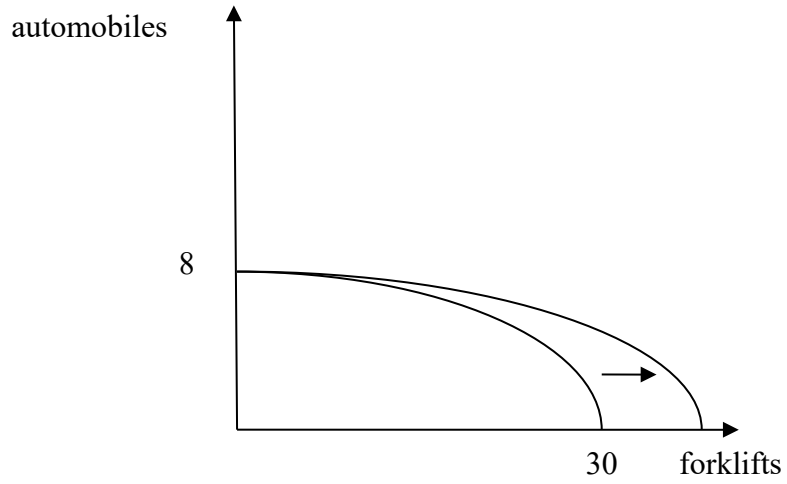
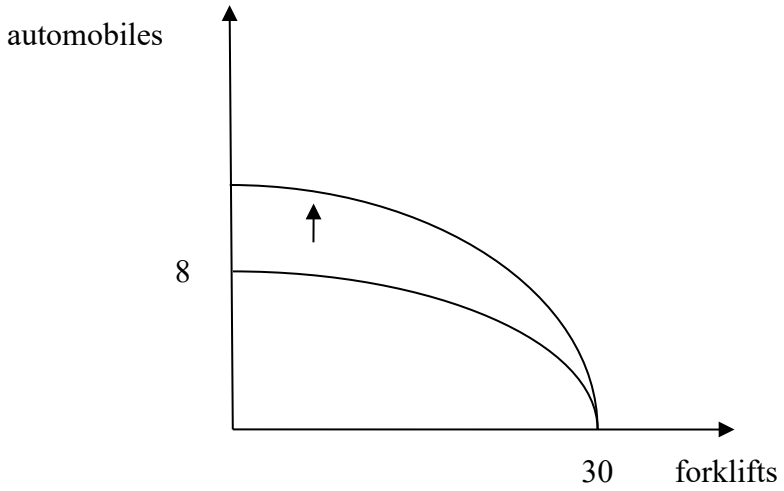
Technological advance in producing forklifts and not automobiles.

Feedback: This implies we can produce more forklifts with the given resources, so the schedule will shift up and out along the horizontal axis.



Technological advance in producing automobiles and not forklifts.

Feedback: This implies we can produce more automobiles with the given resources, so the schedule will shift up along the vertical axis.



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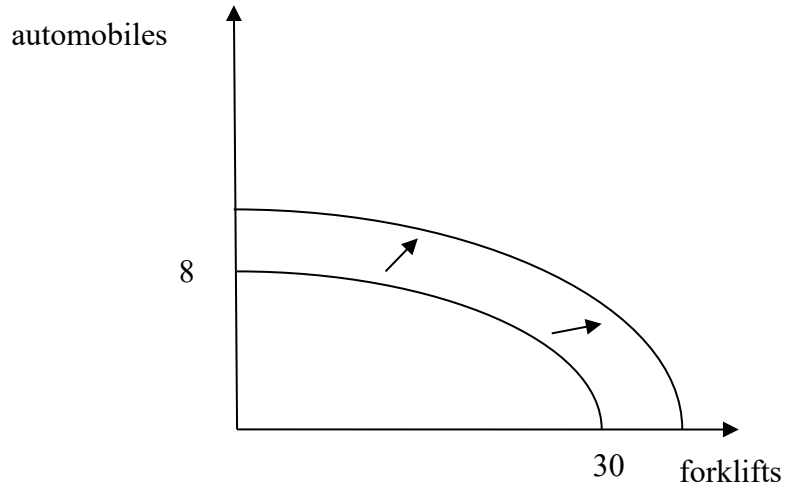
Technological in advance in producing automobiles and forklifts.

Feedback: This implies we can produce more forklifts and automobiles with the given resources, so the schedule will shift up out along the vertical and horizontal axes.



8. Because investment and capital goods are paid for with savings, higher savings rates reflect a decision to consume fewer goods in the present so as to invest in more goods for the future. On average, households in China save about 35 percent of their annual income each year, whereas U.S. households save only around 7 percent. At the same time, production possibilities are growing at roughly 6 percent per year in China but only about 2 percent per year in the United States. Use graphical analysis of "present goods" versus "future goods" to explain the difference between China's growth rate and the U.S. growth rate. **LO1.7**

Answers: See figures below

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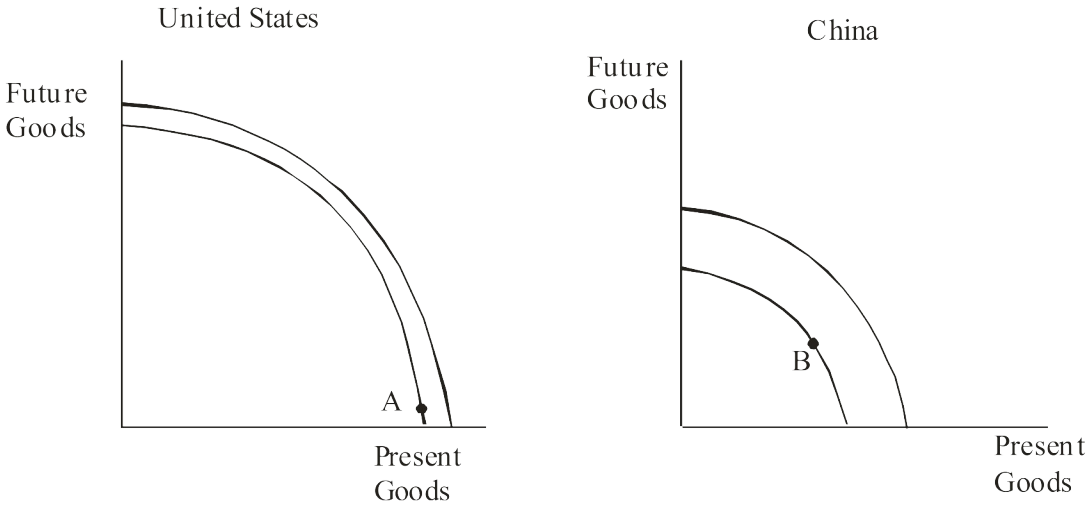

Feedback: Since the United States is consuming more today rather than saving, their production possibilities curve will shift out slower (less) over time because households are accumulating less capital. China's production possibilities curve will shift out faster (more) over time because households are accumulating more capital. See diagrams above.

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