

**Solution to Selected Questions: CHAPTER 3
CONSUMER BEHAVIOR**

Questions for Review

9. Upon merging with the West German economy, East German consumers indicated a preference for Mercedes-Benz automobiles over Volkswagens. However, when they converted their savings into deutsche marks, they flocked to Volkswagen dealerships. How can you explain this apparent paradox?

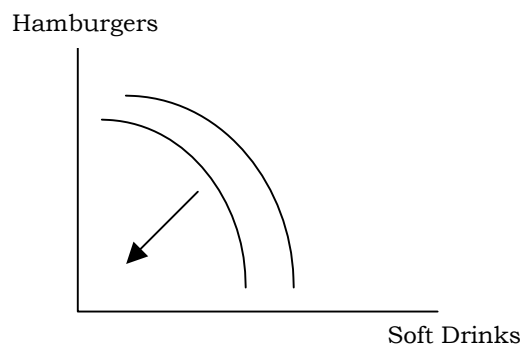
There is no paradox. Preferences do not involve prices, and East German consumers preferred Mercedes based solely on product characteristics. However, Mercedes prices are considerably higher than Volkswagen prices. So, even though East German consumers preferred a Mercedes to a Volkswagen, they either could not afford a Mercedes or they preferred a bundle of other goods plus a Volkswagen to a Mercedes alone. While the marginal utility of consuming a Mercedes exceeded the marginal utility of consuming a Volkswagen, East German consumers considered the marginal utility per dollar for each good and, for most of them, the marginal utility per dollar was higher for Volkswagens. As a result, they flocked to Volkswagen dealerships to buy VWs.

Exercises

2. Draw indifference curves that represent the following individuals' preferences for hamburgers and soft drinks. Indicate the direction in which the individuals' satisfaction (or utility) is increasing.

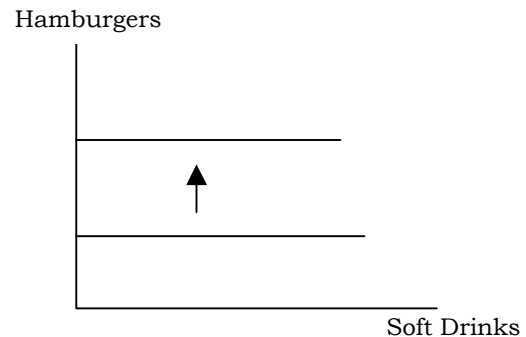
a. Joe has convex preferences and dislikes both hamburgers and soft drinks.

Since Joe dislikes both goods, he prefers less to more, and his satisfaction is increasing in the direction of the origin. Convexity of preferences implies his indifference curves will have the normal shape in that they are bowed towards the direction of increasing satisfaction. Convexity also implies that given any two bundles between which the Joe is indifferent, any linear combination of the two bundles will be in the preferred set, or will leave him at least as well off. This is true of the indifference curves shown in the diagram.



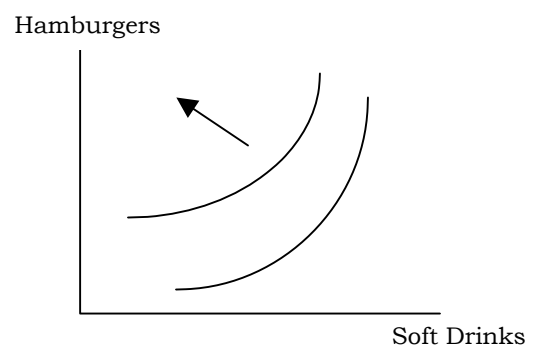
- b. Jane loves hamburgers and dislikes soft drinks. If she is served a soft drink, she will pour it down the drain rather than drink it.**

Since Jane can freely dispose of the soft drink if it is given to her, she considers it to be a neutral good. This means she does not care about soft drinks one way or the other. With hamburgers on the vertical axis, her indifference curves are horizontal lines. Her satisfaction increases in the upward direction.



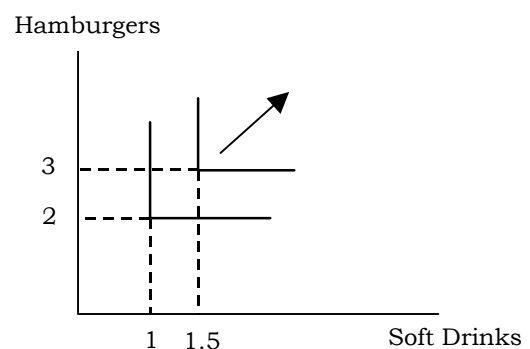
- c. Bob loves hamburgers and dislikes soft drinks. If he is served a soft drink, he will drink it to be polite.**

Since Bob will drink the soft drink in order to be polite, it can be thought of as a “bad”. When served another soft drink, he will require more hamburgers at the same time in order to keep his satisfaction constant. More soft drinks without more hamburgers will worsen his utility. More hamburgers and fewer soft drinks will increase his utility, so his satisfaction increases as we move upward and to the left.



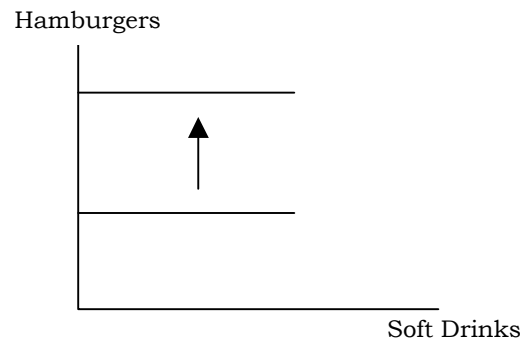
- d. Molly loves hamburgers and soft drinks, but insists on consuming exactly one soft drink for every two hamburgers that she eats.**

Molly wants to consume the two goods in a fixed proportion so her indifference curves are L-shaped. For a fixed amount of one good, she gets no extra satisfaction from having more of the other good. She will only increase her satisfaction if she has more of both goods.



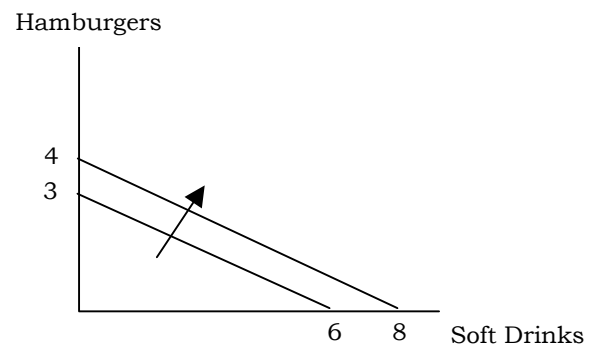
e. Bill likes hamburgers, but neither likes nor dislikes soft drinks.

Like Jane, Bill considers soft drinks to be a neutral good. Since he does not care about soft drinks one way or the other we can assume that no matter how many he has, his utility will be the same. His level of satisfaction depends entirely on how many hamburgers he has, so his satisfaction increases in the upward direction only.



f. Mary always gets twice as much satisfaction from an extra hamburger as she does from an extra soft drink.

How much extra satisfaction Mary gains from an extra hamburger or soft drink tells us something about the marginal utilities of the two goods and about her MRS. If she always receives twice the satisfaction from an extra hamburger, then her marginal utility from consuming an extra hamburger is twice her marginal utility from consuming an extra soft drink. Her MRS, with hamburgers on the vertical axis, is $1/2$ because she will give up one hamburger only if she receives two soft drinks. Her indifference curves are straight lines with a slope of $-1/2$.



3. If Jane is currently willing to trade 4 movie tickets for 1 basketball ticket, then she must like basketball better than movies. True or false? Explain.

This statement is not necessarily true. If she is *always* willing to trade 4 movie tickets for 1 basketball ticket then yes, she likes basketball better because she will always gain the same satisfaction from 4 movie tickets as she does from 1 basketball ticket. However, it could be that she has convex preferences (diminishing MRS) and is at a bundle where she has a lot of movie tickets relative to basketball tickets. As she gives up movie tickets and acquires more basketball tickets, her MRS will fall. If MRS falls far enough she might get to the point where she would require, say, two basketball tickets to give up another movie ticket.

It would not mean though that she liked basketball better, just that she had a lot of basketball tickets relative to movie tickets. Her willingness to give up a good depends on the quantity of each good in her current basket.

6. Suppose that Jones and Smith have each decided to allocate \$1000 per year to an entertainment budget in the form of hockey games or rock concerts. They both like hockey games and rock concerts and will choose to consume positive quantities of both goods. However, they differ substantially in their preferences for these two forms of entertainment. Jones prefers hockey games to rock concerts, while Smith prefers rock concerts to hockey games.

- a. Draw a set of indifference curves for Jones and a second set for Smith.

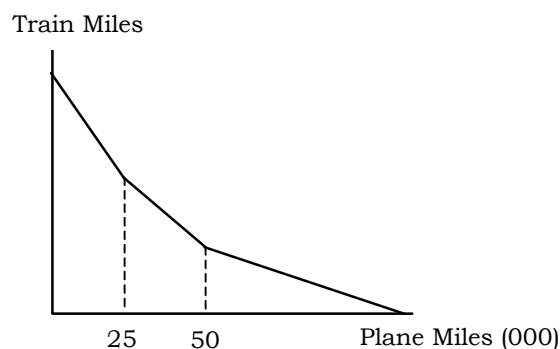
Given they each like both goods and they will each choose to consume positive quantities of both goods, we can assume their indifference curves have the normal convex shape. However since Jones has an overall preference for hockey and Smith has an overall preference for rock concerts, their two sets of indifference curves will have different slopes. Suppose that we place rock concerts on the vertical axis and hockey games on the horizontal axis, Jones will have a larger *MRS* than Smith. Jones is willing to give up more rock concerts in exchange for a hockey game since he prefers hockey games. Thus, indifference curves for Jones will be steeper than the indifference curves for Smith.

- b. Using the concept of marginal rate of substitution, explain why the two sets of curves are different from each other.

At any combination of hockey games and rock concerts, Jones is willing to give up more rock concerts for an additional hockey game, whereas Smith is willing to give up fewer rock concerts for an additional hockey game. Since the *MRS* is a measure of how many of one good (rock concerts) an individual is willing to give up for an additional unit of the other good (hockey games), the *MRS*, and hence the slope of the indifference curves, will be different for the two individuals.

8. Anne has a job that requires her to travel three out of every four weeks. She has an annual travel budget and can travel either by train or by plane. The airline on which she typically flies has a frequent-traveler program that reduces the cost of her tickets according to the number of miles she has flown in a given year. When she reaches 25,000 miles, the airline will reduce the price of her tickets by 25 percent for the remainder of the year. When she reaches 50,000 miles, the airline will reduce the price of her tickets by 50 percent for the remainder of the year. Graph Anne's budget line, with train miles on the vertical axis and plane miles on the horizontal axis.

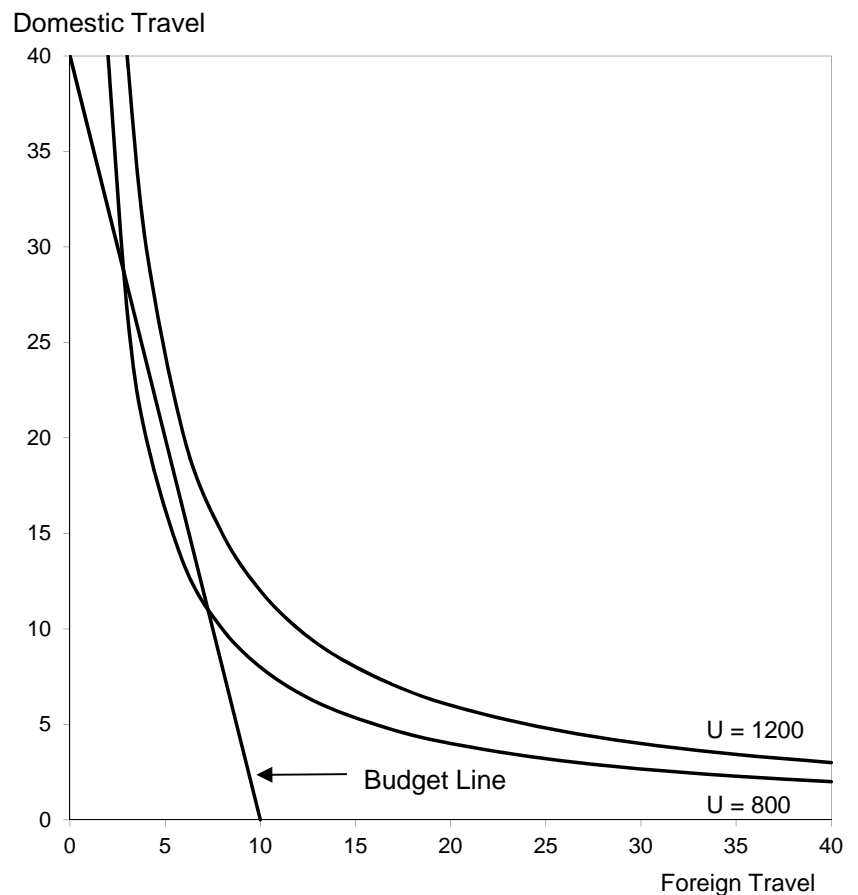
The typical budget line is linear (with a constant slope) because the prices of the two goods do not change as the consumer buys more or less of each good. In this case, the price of airline miles changes depending on how many miles Anne purchases. As the price changes, the slope of the budget line changes. Because there are three prices, there will be three slopes (and two kinks) to the budget line. Since the price falls as Anne flies more miles, her budget line will become flatter with every price change.



15. Jane receives utility from days spent traveling on vacation domestically (D) and days spent traveling on vacation in a foreign country (F), as given by the utility function $U(D,F) = 10DF$. In addition, the price of a day spent traveling domestically is \$100, the price of a day spent traveling in a foreign country is \$400, and Jane's annual travel budget is \$4000.

- a. Illustrate the indifference curve associated with a utility of 800 and the indifference curve associated with a utility of 1200.

The indifference curve with a utility of 800 has the equation $10DF = 800$, or $D = 80/F$. To plot it, find combinations of D and F that satisfy the equation (such as $D = 8$ and $F = 10$). Draw a smooth curve through the points to plot the indifference curve, which is the lower of the two on the graph to the right. The indifference curve with a utility of 1200 has the equation $10DF = 1200$, or $D = 120/F$. Find combinations of D and F that satisfy this equation and plot the indifference curve, which is the upper curve on the graph.



- b. Graph Jane's budget line on the same graph.

If Jane spends all of her budget on domestic travel she can afford 40 days. If she spends all of her budget on foreign travel she can afford 10 days. Her budget line is $100D + 400F = 4000$, or $D = 40 - 4F$. This straight line is plotted in the graph above.

- c. Can Jane afford any of the bundles that give her a utility of 800? What about a utility of 1200?

Jane can afford some of the bundles that give her a utility of 800 because part of the $U = 800$ indifference curve lies below the budget line. She cannot afford any of the bundles that give her a utility of 1200 as this indifference curve lies entirely above the budget line.

d. Find Jane's utility maximizing choice of days spent traveling domestically and days spent in a foreign country.

The optimal bundle is where the ratio of prices is equal to the MRS, and Jane is spending her entire income. The ratio of prices is $\frac{P_F}{P_D} = 4$, and $MRS = \frac{MU_F}{MU_D} = \frac{10D}{10F} = \frac{D}{F}$. Setting the two equal and solving for D, we get $D = 4F$.

Substitute this into the budget constraint, $100D + 400F = 4000$, and solve for F. The optimal solution is $F = 5$ and $D = 20$. Utility is 1000 at the optimal bundle, which is on an indifference curve between the two drawn in the graph above.