

CHAPTER OUTLINE

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Summary

In May 2002, Merrill Lynch agreed to pay \$100 million to settle charges that its analysts had recommended stocks to clients that they privately thought were poor investments. Internal e-mails provided strong support for this claim leveled by the New York State attorney general. For example, InfoSpace, an Internet services company, was rated highly by analysts, yet privately the analysts indicated that it was a "powder keg" and a "piece of junk." Although InfoSpace's share price dropped from

\$261 to \$14, Merrill analysts never recommended selling the stock. Merrill analysts rated Excite@Home "accumulate or buy," while privately the investment team called it a "piece of crap."

This episode at Merrill sent shock waves through other major investment companies, indeed through the rest of the investment community. Other investment firms publicly stated that they were taking strong steps to make sure that the situation at Merrill would not be repeated within their organizations. *Fortune* magazine featured a cover story entitled, "In Search of the Last Honest Analyst."¹ The scandal generated significant concerns throughout the world among both the general public and government regulators. For example, the New York attorney general began a sweeping investigation of analysts at Solomon Smith Barney and other investment firms that had recommended WorldCom to investors. In July 2002, WorldCom became the biggest company ever to file for bankruptcy in U.S. history.

Managers at Merrill, Salomon Smith Barney, and other investment companies had to act quickly to address this potential problem. As a first step, management had to understand what motivated the analysts at Merrill to mislead their investment clients. Only then could they choose a policy to redress the situation. If management thought this problem was caused by a few dishonest employees, the appropriate response would have been to try to identify and fire those employees. If, instead, management thought the problem was caused by disgruntled employees taking out their frustrations on customers, a potential response would have been to adopt a job-enrichment program to increase employee satisfaction and, it would be hoped, analyst honesty. Alternatively, Merrill Lynch might have created incentives through its compensation plan that caused its analysts to issue misleading investment reports. If so, the appropriate response would be to restructure its compensation plan. Many other assumptions and responses are possible.

The example of Merrill Lynch illustrates a general point: Managers' responses to problems are likely to depend on their understanding of people's motives and their forecast of people's reactions—their responses depend on their underlying model of behavior. Most managerial actions attempt to affect the behavior of individuals, such as employees, customers, union officials, or subcontractors. Managers with different understandings (or models) of what motivates behavior are likely to make different decisions and take different actions.

We begin this chapter by briefly summarizing the general framework economists use to examine individual behavior. Some graphical tools are introduced to aid our analysis. Next, we use this economic framework to analyze the problem at Merrill Lynch. The managerial implications of this analysis are discussed. We contrast this economic view of behavior with alternative views and explore why the economic framework is particularly useful in managerial decision making. Finally, we analyze decision making under uncertainty.

Economic Behavior: An Overview

Individuals have unlimited wants. People generally want greater wealth, more attentive service, larger houses, more luxurious cars, and additional personal material items. They want more time for leisure activities. Many people also want to improve the plight of

¹June 10, 2002, issue.

others—starving children, the homeless, and disaster victims. People are concerned about vitality, religion, integrity, and gaining the respect and affection of others.

In contrast to wants, resources are limited. Households face limited incomes that preclude all the purchases and expenditures that members of the households might like to make. The available amount of land, trees, and other natural resources is finite. There are only 24 hours in the day. People become ill; death is inevitable.

Economic Choice

Economic analysis is based on the notion that individuals assign priorities to their wants and choose their most preferred options from among the available alternatives. If Kathy Measer is confronted with a choice between a laptop or a desktop computer, she can tell you whether she prefers one over the other or whether she is indifferent between the two. She correspondingly purchases her preferred alternative. If Kathy has a weekly budget of \$1,000, she considers the many ways she might spend the money and then chooses the package of goods and services that will maximize her personal happiness. She cannot make all desired purchases on her limited budget. However, this choice is optimal for Kathy, given her limited resources.

Economists do not assert that people are selfish in the sense that they care only about their own personal wealth. Within the economic paradigm, people also care about such things as charity, family, religion, and society. For instance, Kathy will donate \$100 to her church, as long as the donation provides greater satisfaction than alternative uses of the money.

Neither do economists contend that individuals are supercomputers that make infallible decisions. Individuals are not endowed with perfect knowledge and foresight, nor is additional information costless to acquire and process.² For example, Kathy might order an item from a restaurant menu only to find that she does not like what she is served. Within this economic paradigm, she simply does the best she can in the face of her imperfect knowledge. But she learns from her experience and does not repeat the same mistakes in judgment time after time.³

Marginal Analysis

Marginal costs and benefits are the incremental costs and benefits that are associated with making a decision.⁴ It is the marginal costs and benefits that are important in economic

²Economists sometimes use the idea of *bounded rationality*. Under this concept, individuals act in a purposeful and *intendedly rational* manner. However, they have cognitive limitations in storing, processing, and communicating information. It is these limitations which make the question of how to organize economic activity particularly interesting. H. Simon (1957), *Models of Man* (John Wiley & Sons: New York).

³At least this learning appears to occur outside the comics. For decades, Charlie Brown from *Peanuts* continued to try to kick the football held by Lucy van Pelt. Yet Lucy always pulled the ball at the last second. Few individuals are as incurably optimistic as Charlie Brown—they learn.

⁴Technical note: *Marginal* costs and benefits are typically defined as changes in costs and benefits associated with very *small changes* in a decision variable. For instance, the marginal costs of production are the additional costs from producing a small additional amount of the product (for instance, one more unit). Often decisions involve discrete choices, such as whether or not to build a new plant. In these cases, it is not possible to define a small change in the decision variable. *Incremental* costs and benefits are those costs and benefits which vary with such a decision. For our present discussion, the technical distinction between marginal and incremental is not important.

Marginal Analysis of Customer Profitability

First Union Corp. (since acquired by Wachovia) used a computer program it called *Einstein* to rank customers based on their profitability. "Profitable" customers keep several thousand dollars in their accounts, use tellers less than once a month, and rarely make calls to the bank's customer call center. "Unprofitable" customers make frequent branch visits, keep less than a thousand dollars in the bank, and call frequently. When a customer requests a lower credit card interest rate or a waiver of the bank's \$28 bounced-check fee, the operator pulls up the customer's account. The computer system displays the customer's name with a red, yellow, or green box next to it. A green box signals the call operator to keep this profitable customer happy by granting the request (within the limits of their authority). Customers with red boxes rarely get what they request, in hopes they will go to another bank. This system is an example of how First Union used marginal analysis to decide the level of service supplied to individual customers—*Einstein* helped the operator identify the marginal costs and benefits of satisfying the bank's customer demands.

Source: R. Brooks (1999), "Unequal Treatment," *The Wall Street Journal* (January 7), A1.

decision making. An action should be taken whenever the marginal benefits of that action exceed its marginal costs. Mary O'Dwyer has a contract to help sell products for an office supply company. She is paid \$50 for every sales call that she makes to customers. Thus, Mary's marginal benefit for making each additional sales call is \$50. Mary enjoys playing tennis more than selling. If she places a marginal value of more than \$50 on the tennis that she would forgo by making an extra call, she should not make any more sales calls that day—the marginal costs would have exceeded the marginal benefits. She continues to make additional sales calls as long as the reduction in tennis playing is valued at less than \$50.⁵

Marginal analysis is a cornerstone of modern economic analysis. In economic decision making, "bygones are forever bygones." Costs and benefits that have already been incurred are *sunk* (assuming they are nonrecoverable) and hence are irrelevant to the current economic decision. Mary paid \$5,000 to join a tennis club last month. This fee does not affect her current decision of whether to play tennis or make an extra sales call. That expenditure is ancient history and does not affect Mary's current trade-offs.

Opportunity Costs

Because resources are constrained, individuals are faced with *trade-offs*. Using limited resources for one purpose precludes their use for something else. For example, if Larry Matteson takes four hours to play golf, he cannot use that same four hours to paint his house. The *opportunity cost* of using a resource for a given purpose is its value in its best alternative use. The opportunity cost of using four hours to play golf is the value of using the four hours in Larry's next best alternative use.

Marginal analysis frequently involves a careful consideration of the relevant opportunity costs. If Larry starts a new pizza parlor and hires a manager at \$30,000 per year, the \$30,000 is an *explicit* cost (a direct dollar expenditure). Is he better off managing the restaurant himself, since he can avoid the explicit cost of \$30,000 by not paying himself a salary? The answer to this question depends (at least in part) on the opportunity cost

⁵To keep this example simple, we abstract from several issues. We ignore any pleasure Mary receives from the process of selling. Also, selling effort today is likely to have some effect on her future professional progress. Finally, if Mary values a tennis game at 9 A.M. and one at 7 P.M. equally, she will sell during the business day and postpone tennis to the evening.

Marginal Analysis: An Example

Ludger Hellweg owns a company that installs wood floors. He is offered \$20,000 to install a new floor. The opportunity cost of his labor and other operating expenses (excluding the wood) are \$15,000. He has wood for the job in inventory. It originally cost him \$2,000. Price increases have raised the market value of the wood to \$6,000, and this value is not expected to change in the near future. Should he accept the contract?

He should compare the marginal costs and benefits from the project. The marginal benefit is \$20,000. The marginal cost is \$21,000—\$15,000 for the labor and operating expenses and \$6,000 for the wood. The historic cost for the wood of \$2,000 is not relevant to the decision. He must replace the wood used on this job for \$6,000. Since the marginal costs exceed the marginal benefits, Ludger would be better off rejecting the contract than accepting it. This example illustrates that in calculating marginal costs, it is important to use the opportunity cost of the incremental resources, not their historic (accounting) cost.

of his time. If he can earn exactly \$30,000 in his best alternative job, the *implicit* cost of self-management is the same as the explicit cost of hiring an outside manager: He forgoes \$30,000 worth of income if he manages the parlor himself. Both explicit and implicit costs are opportunity costs that should be considered in the analysis. Suppose that Larry's gross profit from the pizza parlor, before paying the manager a salary, is \$35,000 and that he can earn \$40,000 in an outside job. Hiring a manager for \$30,000 yields a net profit of \$5,000 from the pizza parlor. He also earns \$40,000 from the outside job, for total earnings of \$45,000. If he manages the pizza parlor himself, he earns only \$35,000. In this example, it is better for him to work at the outside job and hire a manager to run the restaurant.⁶

Creativity of Individuals⁷

Within this economic framework, individuals maximize their personal happiness given resource constraints. Indeed, people are quite creative and resourceful in minimizing the effects of constraints. For instance, when the government adopts new taxes, almost immediately accountants and financial planners begin developing clever ways to reduce their impact. Some self-employed individuals were able to reduce the impact of recent tax increases by changing the status of their incorporation.

As another example, a 33-year-old Brazilian farm hand recently retired with full social security benefits after he satisfied social security auditors that he had been working

Opportunity Costs and V-8

The Campbell Soup Company used the idea of an opportunity cost to create a successful ad campaign for its V-8 vegetable juice. Upon finishing a soft drink, the fellow in the ad would look into the camera, slap his forehead, and exclaim: "Wow—I coulda had a V-8." Since one is unlikely to drink both a soft drink and a V-8, the opportunity cost of the soft drink is the forgone V-8—a cost that these commercials sought to convince the viewing audience is quite high.

⁶Again, to keep the example simple, we assume there is no difference in personal satisfaction between Larry's outside job and managing the pizza parlor. We also postpone the discussion of consequences for the success of the pizza parlor from hiring a manager versus self-management until Chapter 10.

⁷This section draws on W. Meckling (1976), "Values and the Choice of the Model of the Individual in the Social Sciences," *Schweizerische Zeitschrift für Volkswirtschaft und Statistik*, 112, 545–560.

Creative Gaming of the System

An MIS manager bought computers for his company one at a time, charging them on his personal credit card. He then filed for reimbursement on his expense account. Although this process imposed delay costs on the firm—it required almost a year for the company to acquire 20 computers—the manager received frequent flyer miles given by his credit card company.

Source: S. Adams (1996), *The Dilbert Principle* (Harper Business: New York), 326.

since he was three years old. Because Brazil doesn't specify a minimum retirement age, the average Brazilian retires at age 49.⁸

Similarly, when hackers and corporate spies continue to develop more sophisticated schemes to steal information from Web sites or networks, software tools that detect break-ins also have grown in popularity and sophistication. This intrusion-detection software was about a \$100 million industry in 1999 and is expected to grow to a billion dollar industry within a few years.⁹

Understanding this creative nature of individuals has important managerial implications which we discuss later in this chapter, as well as throughout the book.

Graphical Tools

Economists often employ a set of graphical tools to illustrate how individuals make choices. We use these tools throughout this book. They also are used in other courses within the typical business school curriculum, such as in finance, human relations, and marketing courses. Our intent is to introduce these tools so that the reader is comfortable using them in simple applications. (We avoid discussion of the more technical considerations that underlie their development.) We then apply the tools to analyze the problems at Merrill Lynch.

Individual Objectives

Goods are things that people value. Goods include standard products like food and clothing, services like haircuts and education, as well as less tangible emotions such as love of family and charity. The economic model of behavior posits that people acquire goods that maximize their personal happiness, given their resource constraints (such as a limited income). Economists traditionally use the term *utility* in referring to personal happiness.

To provide a more detailed analysis of how people make choices, economists represent an individual's preferences by a *utility function*. This function expresses the relation between total utility and the level of goods consumed. The individual's objective is to maximize this function, given the resource constraints.¹⁰ This concept can be illustrated

⁸P. Fritsch (1999), "In Brazil Retirement Has Become a Benefit Nearly All Can Enjoy," *The Wall Street Journal* (September 9), A1.

⁹J. D'Allegro (1999), "Intrusion Detection Matures," *National Underwriter* (March 8), 9.

¹⁰Clearly, most individuals do not actually consider maximizing a mathematical function when they make these choices. However, this formulation can provide useful insights into actual behavior to the extent that it *approximates* how individuals make choices. Mathematicians have shown that if an individual's behavior is consistent with some basic "axioms of choice" (comparability, transitivity, nonsatiation, and willingness to substitute), the individual will make choices *as if* he or she were trying to maximize some utility function.

Response to Increase in Burglaries in Japan

Japan has long prided itself on having the safest neighborhoods in the industrialized world. But its long recession has triggered a jump in burglaries. What's bad news for upscale Osaka and Tokyo, however, is good news for the leading security systems provider Secom. "I feel very good now," says founder Makoto Iida. He should: For the year ended in March, his 37-year-old company rang up \$2.9 billion in revenues and profits of \$400 million. Secom's 8 percent return on equity is stupendous by Japanese standards. And demand for its \$80-per-month system, which uses sensors to detect intruders and set off an alarm, has grown 20 percent per year since the mid-1990s.

Source: M. Tanikawa and J. Olek (1999), "Japan: Big Bucks for Foiling Burglars," *Business Week* (July 5), 8.

most conveniently through a simple example where an individual cares about only two goods. The insights from this two-good analysis can be extended readily to the case of additional goods such as food, housing, clothing, respect, and charity.

Suppose that Dominique Lalisse values only food and clothing. In general form, his utility function can be written as follows:

$$\text{Utility} = F(\text{Food}, \text{Clothing}) \quad (2.1)$$

Dom prefers more of each good—thus, his utility rises with both food and clothing. In Dom's case, his specific utility function is

$$\text{Utility} = \text{Food}^{1/2} \times \text{Clothing}^{1/2} \quad (2.2)$$

For instance, if Dom has 16 units of food and 25 units of clothing, his total utility is 20 (that is, $\text{utility} = 16^{1/2} \times 25^{1/2} = 4 \times 5 = 20$). Dom is better off with 25 units of both food and clothing. Here, his utility is 25 ($\text{utility} = 25^{1/2} \times 25^{1/2} = 5 \times 5 = 25$).

Utility functions rank alternative bundles of food and clothing in the *order* of most preferred to least preferred, but they do not indicate how much one bundle is preferred to another. If the utility index is 100 for one combination of food and clothing and 200 for another, Dom will prefer the second combination. The second bundle does not necessarily make him twice as well off as the first bundle.¹¹ This formulation does not allow one person's utility of a bundle to be compared to another person's utility.

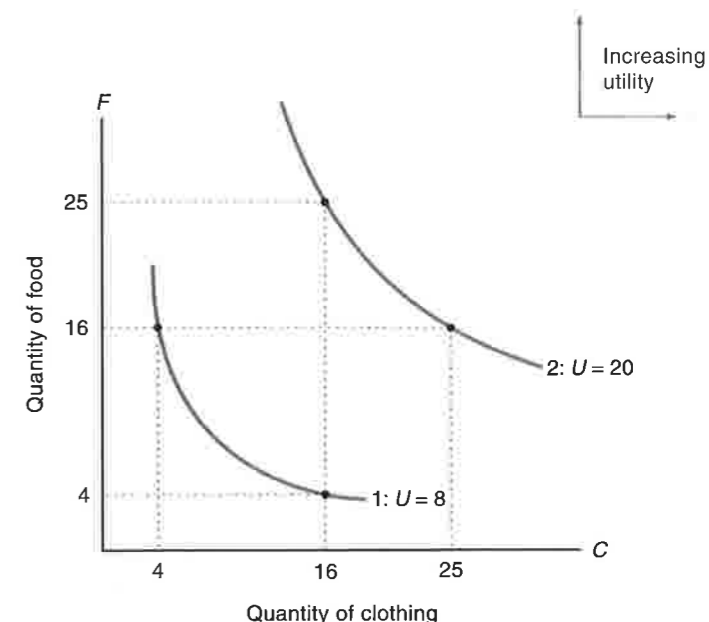
Indifference Curves

Preferences implied by the utility function can be illustrated graphically through *indifference curves*. An indifference curve pictures all combinations of goods that yield the same utility. Given his utility function in Equation (2.2), Dom is indifferent between either 16 units of food and 25 units of clothing or 25 units of food and 16 units of clothing. Both combinations yield 20 units of utility, and hence are on the same indifference curve. Figure 2.1 shows two of Dom's indifference curves. For example, if given a choice between any two points on curve 1, Dom would say that he does not care which one is selected—in either case, he obtains 8 units of utility.

¹¹This is like rankings on a test—an individual who scores in the 80th percentile is not twice as smart as one from the 40th.

Figure 2.1 Indifference Curves

These indifference curves picture all combinations of food and clothing that yield the same amount of utility. The specific utility function in this example is $U = F^{1/2} \times C^{1/2}$, where F is food and C is clothing. Northeast movements are utility-increasing. Indifference curve 2 represents all combinations of food and clothing that yield 20 units of utility, whereas curve 1 pictures all combinations that yield 8 units of utility. Other indifference curves could be drawn for different levels of utility.



The slope at any point along one of Dom's indifference curves indicates how much food he would be *willing to give up* for a small increase in clothing (his utility remains unchanged by this exchange).¹² Standard indifference curves that illustrate trade-offs between two goods have negative slopes. If Dom obtains a smaller amount of one good such as food, the only way he can be equally as well off is to obtain more of another good like clothing. If the slope at a point along an indifference curve is -2 , Dom is willing to give up 2 units of food to obtain 1 unit of clothing. Alternatively he is willing to give up $1/2$ unit of clothing to obtain 1 unit of food. This *willingness to substitute* has important implications, which we discuss below.

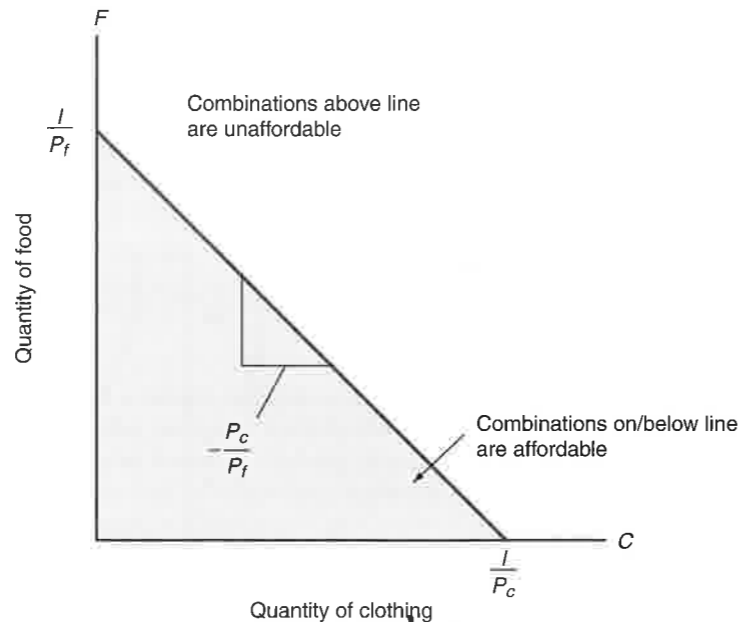
North and east movements in graphs like Figure 2.1 are utility-increasing. Holding the amount of food constant, utility increases by increasing clothing (an eastward movement). Holding the amount of clothing constant, utility increases by increasing the amount of food (a northward movement). Thus, in Figure 2.1, Dom would rather be on indifference curve 2 than on 1. He obtains 20 units of utility rather than 8.

Economists typically picture indifference curves as convex to the origin (they bow in, as in Figure 2.1). Convexity implies that if Dom has a relatively large amount of food, he would exchange a relatively large quantity of food for a small amount of additional clothing. Thus, the indifference curves in Figure 2.1 are steep when the level of food is high relative to the level of clothing. In contrast, if he has a relatively large amount of clothing, he would be willing to substitute only a small amount of food for additional clothing. Correspondingly, the indifference curves in Figure 2.1 flatten as Dom has less

¹²Recall that the slope of a line is a measure of steepness, defined as the increase or decrease in height per unit of distance along the horizontal axis. Slopes of curves are found geometrically by drawing a line tangent to the curve at the point of interest and determining the slope of this tangent line. The slope at a point along one of Dom's indifference curves indicates how the quantity of food changes for small changes in the amount of clothing in order to hold utility constant. Since by definition Dom is indifferent to this exchange (he remains on the same indifference curve), he is *willing* to make the exchange.

Figure 2.2 Constraint

The constraint reflects the feasible combinations of food and clothing that are attainable given the person's income (I). The vertical and horizontal intercepts, respectively, show the amounts of food and clothing that can be purchased if no income is spent on the other good. The slope of the constraint is equal to -1 times the ratio of the prices of the two goods. For instance, if the price of clothing is \$8 and the price of food is \$2, the slope will be -4 . This slope implies that 4 units of food must be given up for 1 unit of clothing. If both goods have the same price, the slope will be -1 .



food and more clothing. The behavior implied by the convexity of indifference curves is consistent with the observed behavior of many individuals—most people purchase balanced combinations of food and clothing.

Constraints

Dom would like more of both food and clothing. Unfortunately, he faces a budget constraint that limits his purchases. Suppose that he has an income of I and the prices per unit of food and clothing are P_f and P_c , respectively. Since he cannot spend more than I , he faces the following constraint:

$$I \geq P_f F + P_c C \quad (2.3)$$

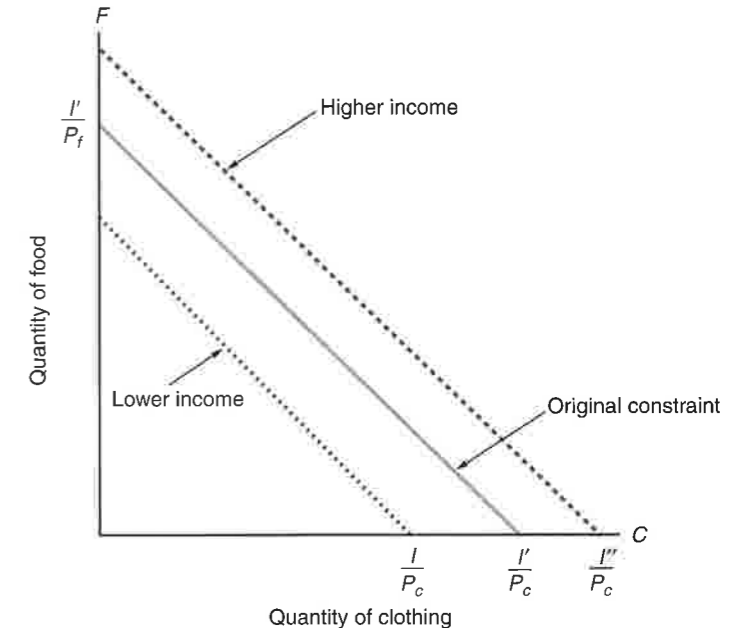
where F and C represent the units of food and clothing purchased. The constraint indicates that only combinations of food and clothing that cost no more than I are feasible. Rearranging terms, this constraint can be written as

$$F \leq I/P_f - (P_c/P_f)C \quad (2.4)$$

Figure 2.2 pictures this constraint—sometimes called a *budget line*. All combinations of food and clothing on or below the line are attainable. Combinations above the line are not feasible given an income of I . The F intercept (on the vertical axis) of the line I/P_f indicates how much food Dom can purchase if his entire income is spent on food and no clothing is purchased. The C intercept is correspondingly I/P_c . The slope of the line $-P_c/P_f$ is -1 times the ratio of the two prices. The ratio P_c/P_f is the *relative price* of clothing in terms of food. It represents how many units of food must be given up to acquire a unit of clothing. It is the opportunity cost of clothing. For example, if the price of clothing is \$8 and the price of food is \$2, the relative price of clothing is 4.

Figure 2.3 Income Changes

This figure shows that there is a parallel shift in the constraint when income changes. The slope of the constraint does not change because there is no change in the prices of the two goods. The slope is -1 times the ratio of the prices.



To keep total expenditures constant, 4 units of food must be given up for every unit of clothing purchased. The relative price of food is P_f/P_c (in this example, 0.25); $1/4$ unit of clothing must be given up for each unit of food purchased.

The constraint changes with changes in Dom's income and the relative prices of the two goods. As shown in Figure 2.3, changes in income result in parallel shifts of the constraint: Its slope is unaffected. An increase in income shifts the constraint outward (up and to the right), while a decrease in income shifts the constraint inward. The slope of the constraint changes with the relative prices of the two goods. As shown in Figure 2.4, if the price of clothing increases relative to the price of food, the constraint becomes steeper. If the price of clothing falls relative to the price of food, the constraint becomes flatter.

Individual Choice

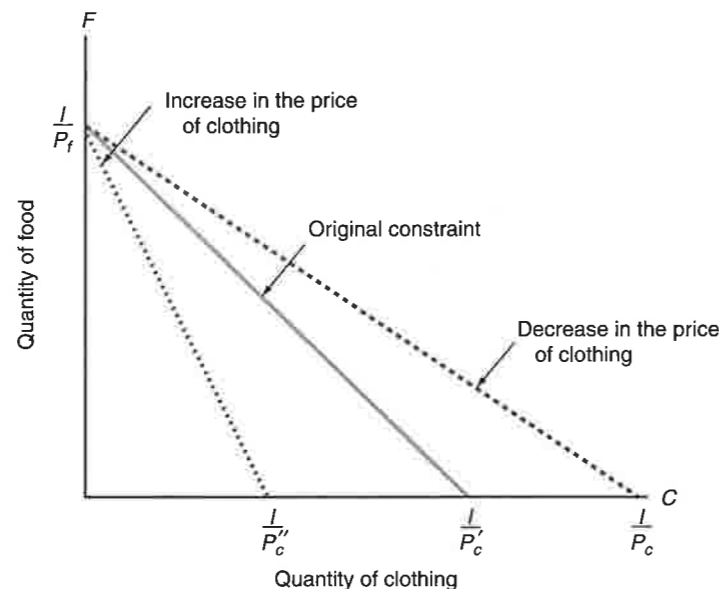
Within this economic framework, Dom's goal is to maximize utility given the constraint. Utility is maximized at the point of tangency between the constraint and an indifference curve.¹³ Figure 2.5 portrays the optimal choice. Dom could choose points like b and c on indifference curve 1. However, point a on curve 2 is preferred. Dom would prefer to be at any point on curve 3. Yet, these points are not attainable given his income.

This graphical solution to Dom's choice problem has a simple intuitive interpretation. At the point of tangency, the indifference curve and the constraint have equal slopes. Recall that the slope of the indifference curve represents Dom's willingness to

¹³For simplicity, we ignore the possibility of corner solutions—the points where the budget constraint intersects the axes. With corner solutions, the individual spends all income on only one good.

Figure 2.4 Price Changes

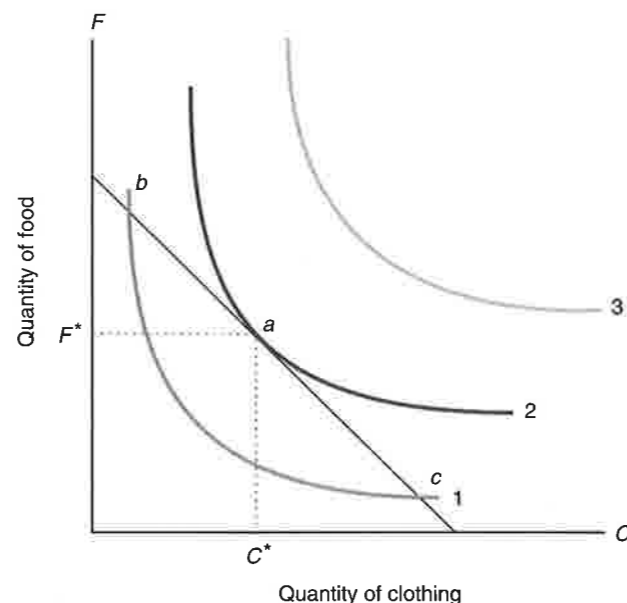
This figure shows how the slope of the constraint changes with changes in the price of clothing. The slope of the line is $-(P_c/P_f)$. Thus, an increase in the price of clothing (from P'_c to P''_c) produces a steeper line, while a decrease (from P'_c to P_c) produces a flatter line. Changes in the price of food also affect the slope of the line.



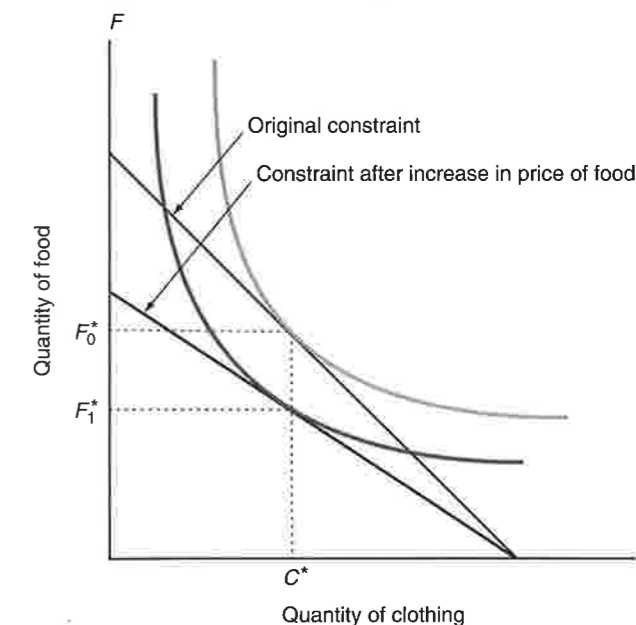
trade food for clothing, whereas the slope of the constraint represents the terms of trade available in the marketplace. At the optimal choice, the *willingness and ability to trade are equal*. At other feasible combinations of food and clothing, Dom's utility could be increased by making substitutions. For instance, if Dom were at a point where he was willing to trade 5 units of food for 1 unit of clothing and if the relative

Figure 2.5 Optimal Choice

The individual is best off by choosing point *a* where the constraint is tangent to indifference curve 2. This optimal combination of food and clothing, F^* and C^* , yields higher utility than other feasible alternatives (for example, points *b* and *c*). The individual would prefer points on indifference curve 3, but these points are not feasible given the constraint.

**Figure 2.6 Optimal Choice and Price Changes**

This figure shows how the optimal choice changes with an increase in the price of food. In this example, the individual chooses less food (F_1^* rather than F_0^*). This is the typical case—usually, an individual will purchase less of a good when its price increases. Due to the particular utility function used in this example, the amount of clothing purchased remains unchanged (C^*). More generally, the amount of clothing purchased can go either up or down. It depends on the location of the new tangency point.



price of clothing were 4 (the slope of the indifference curve is steeper than the constraint), Dom would be better off purchasing less food and more clothing. (He is willing to trade 5 units of food for one unit of clothing, but only has to give up 4 units of food to obtain 1 unit of clothing in the marketplace.) Alternatively, if Dom were at a point where he was only willing to give up 1 unit of food for 1 unit of clothing (the slope of the indifference curve is flatter than the constraint), he would be better off purchasing more food and less clothing—since he receives 5 units of food for each unit of clothing given up.

Changes in Choice

Dom's constraint will change whenever prices or income change. Correspondingly, he will make different choices. Recall that changes in relative prices alter the slope of the constraint. When the relative price of a good increases, individuals typically choose less of that good.¹⁴ Figure 2.6 shows how Dom will purchase less food as its relative price increases—food is more expensive and so less attractive than it was at a lower price. Generally the amount of clothing purchased can go either up or down; it depends on the location of the new tangency point. (Given the particular utility function used in this example, the amount of clothing purchased remains unchanged.) Even though the price of clothing is relatively more attractive, the increase in food prices can limit available income so as to reduce the amount purchased of both goods. Changes in Dom's income cause parallel shifts in the constraint and will change his optimal choice. In Chapter 4, we examine in more detail how changes in income and prices affect consumption choices.

¹⁴In principle, some individuals might purchase more of a good if the price increases, but this outcome is rarely observed.

Choices also change if preferences change. Now changes in preferences undoubtedly occur. (Do you really believe that Toys 'R' Us will have any difficulty satisfying the demands for Teenage Mutant Ninja Turtle action figures, Tomaguchi virtual pets, Tickle-Me-Elmo dolls, or Pokemon Cards next Christmas?) Yet, economists rarely focus on such explanations. Economics has little theory to explain what might cause preferences to change. And since a large premium is placed on operationalism in managerial economics, preference-based explanations generally are appealed to only after other potential explanations are exhausted. In a sense, these preference-based explanations are too easy—they work too well. Virtually any observed behavior can be explained by appealing to preferences: Why did the consumption of frozen yogurt increase relative to that of ice cream? People's preferences changed so that more frozen yogurt and less ice cream was demanded. But a reduction in consumption could be "explained" just as readily. Without a deeper understanding of why preferences change, one is left "explaining" everything but with an analysis that allows you to predict nothing.

Ultimately, the managerial usefulness of this analysis comes from its power to identify policy instruments that have a predictable impact on the problems at hand. Across a broad array of problems, assuming that underlying preferences are reasonably stable and analyzing the impact of changes in constraints regularly will yield important managerial insights and identify productive managerial tools.

Motivating Honesty at Merrill Lynch

Often, economists focus on consumption goods such as food and clothing. This focus is natural given the interests economists have in understanding consumer behavior. Yet this analysis can easily be extended to consider other goods that people care about, such as love and respect.¹⁵ Such an extension can be used to analyze the problem at Merrill Lynch.

Suppose that Susan Chen, like other analysts at Merrill Lynch, values two goods—money and integrity. Her utility function is

$$\text{Utility} = F(\text{Money}, \text{Integrity}) \quad (2.5)$$

Money is meant to symbolize general purchasing power; it allows the purchase of goods such as food, clothing, and housing. Integrity is something Sue values for its own sake—being honest in her dealings with other people makes Sue feel good and she values it for that reason.

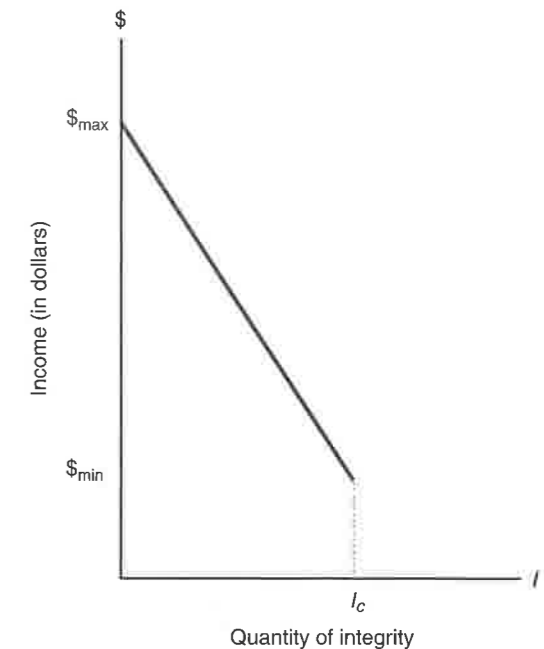
Suppose that integrity can be measured on a numerical scale with Sue preferring higher values. For example, 5 units of integrity provide more utility than 4 units of integrity. (In actuality, measuring a good like integrity on a numerical scale may be quite difficult. Yet this complication does not limit the qualitative insights that we can derive from the analysis.)

Merrill paid its stock analysts an annual bonus that was based partly on the analyst's contribution to the investment banking side of the business (e.g., the firm's underwriting activities). If Sue were completely honest and rated a company as a poor investment, the management of that company might take its investment banking business to another firm. The resulting loss in Merrill's investment banking revenue would reduce Sue's annual bonus. This bonus scheme confronts Sue with a trade-off. She can be

¹⁵G. Becker (1993), "Nobel Lecture: The Economic Way of Looking at Behavior," *Journal of Political Economy* 101, 385–409.

Figure 2.7 Nature of Constraint Facing an Analyst at Merrill Lynch

The constraint pictures the maximum amounts of money and integrity that are possible for the analyst given the bonus plan and conditions at the company. If the analyst sacrifices all integrity and recommends stocks even if they are poor investments, the employee earns a maximum of $\$_{\max}$ a year. Investment banking business is lost if the analyst gives objective advice and rates certain stocks as poor investments (selects a higher level of integrity). Income is lower since the analyst is paid a bonus based on investment banking revenues. I_c represents complete honesty.



honest and feel good about maintaining her integrity, or she can be dishonest in her rating of the stock and obtain a higher bonus. She also might consider the future effects on her income from developing a good or bad reputation as an investment analyst. However, the analysis in this chapter is framed in a simple one-period context and does not consider monetary returns from developing a good reputation. (In subsequent chapters we extend the analysis and consider such multiperiod effects.)

Figure 2.7 depicts Sue's implied constraint. This constraint shows the maximum amounts of income and integrity that are possible given the compensation plan and conditions at the company.¹⁶ If Sue sacrifices all integrity, she earns $\$_{\max}$ a year. If she is scrupulously honest in her investment recommendations, she earns much less (there is a positive floor on her income, $\$_{\min}$, since her base salary does depend on the amount of investment banking business). Intermediate options along the constraint are possible. While Sue would like to earn more than $\$_{\max}$, higher income is not feasible in this job.

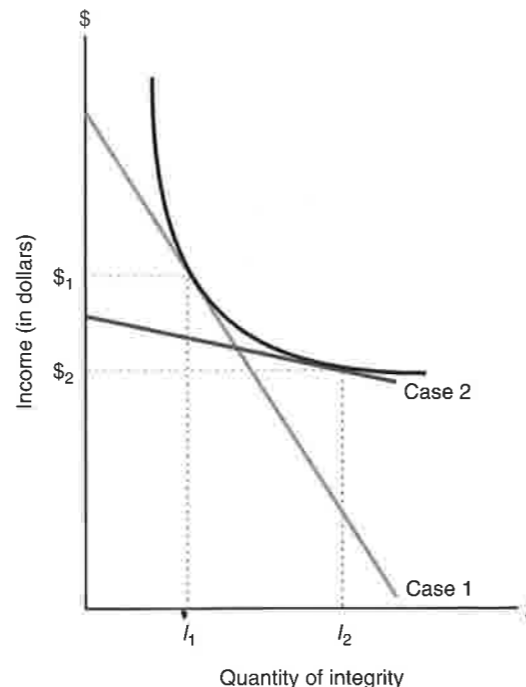
Sue chooses the combination of integrity and income that places her on the highest attainable indifference curve. This choice occurs at the point of tangency between her indifference curve and the constraint. Sue ends up selecting relatively low amounts of integrity because the bonus plan adopted by Merrill's management has made integrity expensive. If Sue chooses more integrity, she must forfeit a relatively large amount of income.

Management can alter the constraint facing Sue and her colleagues by changing its compensation plan. In the Merrill case, reducing the emphasis of investment banking

¹⁶For simplicity, we draw the constraint as linear. Linearity is not necessary for our analysis. Also, we want to emphasize that we put dollars on the vertical axis only because it is a convenient general indication of value, not because money is more important than other things. We could illustrate Sue's willingness to trade integrity against anything else Sue values, such as Big Macs, pianos, or pairs of jeans.

Figure 2.8 Optimal Choices of an Analyst at Merrill Lynch under Two Different Compensation Plans

Case 1 reflects the original compensation plan. In this case, compensation includes a high bonus based on investment banking revenues and the constraint is relatively steep. In Case 2, the firm reduces the emphasis on investment banking revenues in compensating analysts. The slope of the constraint is flatter. The result is that the individual chooses a higher level of integrity in Case 2 than in Case 1.



revenue in determining the annual bonus reduces the gains from dishonest advice and thus flattens the constraint. Changes in the slope of the constraint result in a different tangency point and thus a different choice. Figure 2.8 shows how Sue's optimal choice changes when the emphasis on investment banking revenue is decreased.¹⁷ The result

Money and Job Satisfaction

In surveys of 400 executives by the Young President's Organization, they admitted that the "pursuit of money consumed them," yet played down the importance of money in career choices. Some equated wealth with self-worth and others said, "There's never enough." However in attitude surveys, career-development programs consistently top employees' list of wants. Managers often insist they would never make career decisions primarily based on money. One manager ranks his family's well-being and happiness as most important, but still appreciates the monetary value of the job. One manager who received a large bonus said he will use the money for his children's education, "It's given me a sense of relief. Now I can redirect some money to things we haven't done or divert it into a retirement fund." Thus, these executives clearly value things other than money and regularly make choices that trade off money for other things that they value.

Source: H. Lancaster (1998), "Needy or Greedy?" *The Wall Street Journal* (June 30), B1.

¹⁷We have altered the compensation scheme in a manner that places Sue on the same indifference curve. The rationale for doing this is as follows: Merrill Lynch must provide Sue with sufficient utility to retain her at the firm. Below this level of utility, Sue will quit and work elsewhere. Merrill Lynch is unlikely to want to pay Sue more than this minimum utility because it reduces firm profits. Thus, Merrill Lynch has an incentive to adjust compensation in a manner that keeps her on the same indifference curve. Sue's indifference curve in Figure 2.8 can be viewed as this "reservation" utility. These issues are covered in more detail in Chapter 14.

is more honest behavior. In essence, Sue "purchases" more integrity because it now is less expensive. Consistent with this analysis, Merrill in its settlement with the State of New York agreed to change the way it evaluated and compensated its analysts. Bonuses now are based on the quality of investment advice, not tied to investment banking business.

Managerial Implications

This analysis illustrates how the economic framework can be used to analyze and address management problems. Managers are interested in affecting the behavior of individuals such as employees, customers, union leaders, or subcontractors. Understanding what motivates individuals is critical. The economic approach views individual actions as the outcomes of maximizing personal utility. People are willing to make substitutions (for example, less leisure time for more income) so long as the terms of trade are advantageous. Managers can affect behavior by appropriately designing the constraints faced by individuals. The design of the constraints affects the trade-offs that individuals face and hence their choices. For example, management can motivate employees through the structure of compensation plans or customers through pricing decisions.

The outcome of individuals making economic choices is a function of both constraints and preferences. Individuals try to achieve their highest level of satisfaction given the constraints they face. Our discussion of management implications, however, intentionally focuses on constraints, not preferences. As a management tool, the usefulness of focusing on personal preferences often is limited. Preferences rarely are observable, and (as we noted earlier) virtually any observed change in choice can be "explained" as simply a matter of a change in personal tastes. But, it is difficult to change what a person likes or does not like. A preference-based explanation as to why employees were dishonest at Merrill Lynch is that these employees gained personal utility from being dishonest (or compared to employees at other firms, Merrill Lynch employees were willing to trade large amounts of personal integrity for small financial rewards). This explanation is not very helpful in giving management guidance on how to address the problem. It suggests that Merrill Lynch might try to fire dishonest employees and replace them with employees who care more about personal integrity. But the difficulty of observing personal preferences limits the viability of this approach. How would Merrill Lynch know if, as a group, the new hires would be any less dishonest than the old employees? You cannot just ask applicants if they are honest—if they are not, they will have no qualms about claiming that they are.

The fact that individuals are clever and creative in minimizing the effects of constraints greatly complicates management problems. Changing incentives will affect employee behavior, though sometimes in a perverse and unintended manner. Consider two of the Soviet Union's early attempts to adopt incentive compensation to motivate employees. To discourage taxi drivers from simply parking their cabs, they were rewarded for total miles traveled; to encourage additional production, chandelier manufacturers were rewarded on total volume of production—measured in kilograms. In response to these incentive plans, taxi drivers began driving empty cabs at high speeds on highways outside Moscow, and chandelier manufacturers started producing such massive fixtures that they literally would collapse ceilings. (It is less costly to make one 100-kilo chandelier than five 20-kilo chandeliers; manufacturers also substituted lead for lighter-weight inputs.) Merrill Lynch initially adopted bonuses to motivate analysts to work harder. The dishonest behavior was a side effect that potentially was not anticipated when the plan was adopted.

Perverse Incentives at Lincoln Electric

Lincoln Electric is a successful company that manufactures arc welding equipment. It is famous for a strong emphasis on incentive compensation. Their incentive program appears to be an important source of the high productivity of Lincoln's production workers. At one point, Lincoln Electric decided to extend its incentive compensation program to clerical workers. Counters were installed on typewriters and secretaries were paid on the number of characters typed. This policy resulted in an increase in the amount of typing. The program, however, was discontinued when it was discovered that a secretary spent her lunch hour typing worthless pages by depressing a repeating key in order to increase her compensation.

Source: N. Fast and N. Berg (1975), "The Lincoln Electric Company," Harvard Business School Case #376-028.

In summary, the economic approach to behavior has important managerial implications. The framework suggests that a manager can motivate desired actions by establishing appropriate incentives. However, managers must be careful because setting improper incentives can motivate perverse behavior.

It is worth noting that economic analysis is limited in its ability to forecast the precise choices of a given individual because individual preferences are largely unobservable. The focus is on aggregate behavior or on what the typical person tends to do. For example, an economist might not be very good at predicting the individual responses of a group of employees to a new incentive plan. An economist will be successful in predicting that the typical employee will work harder—and thus output for the group will rise—when compensation is tied to output, than when a fixed salary independent of performance is paid. Managers typically are interested in structuring an organizational architecture that will work well and does not depend on specific people filling particular jobs. Individuals come and go, and the manager wants an organization that will work well as these changes occur. In this context, the economic framework is likely to be very useful. To solve management problems where the characteristics of a specific individual are more important, other frameworks may be more valuable. For example, if the board is interviewing a potential new CEO, insights into that individual's behavior derived from psychology might be extremely useful.

Alternative Models of Behavior¹⁸

We have shown how the economic view of behavior can be used in managerial decision making. We now discuss four other models that are commonly used by managers (either explicitly or implicitly) to explain behavior. Our discussion of each of these models is simplified. The intent, however, is to capture the essence of a few of the more prominent views that managers have about behavior and to illustrate how managerial decision making is affected by the particular view. We contrast these alternative views with the economic view and argue why the economic framework is a particularly useful tool for managers.

Only-Money-Matters Model

Some people believe that the only important component of the job is the level of monetary compensation. But as we have already suggested, people have an incredibly broad range of interests, extending far beyond money. And these interests are reflected in a

¹⁸This section draws on W. Meckling (1976).

Happy-Is-Productive versus Economic Explanations of the Hawthorne Experiments

Seven productivity studies were conducted at Western Electric's Hawthorne plant over the period 1924–1932. All seven studies focused on the response of assembly workers' productivity when different aspects of the work environment were manipulated (for example, length of break times and workday). Surprisingly, productivity rose virtually regardless of the particular manipulation. For example, it is claimed that productivity increased whenever illumination of the work area was changed, regardless of the direction of the change. When the lights were turned up, productivity increased, and when they were turned down, productivity increased, as well. This result is known as the Hawthorne Effect and is among the most discussed findings in psychology; it often is taken as support for the happy-is-productive model. The workers in the experiment were given special attention and nonauthoritarian supervision relative to other workers at the plant. Also, the affected workers' views on the experiments were solicited by management, and the workers were given more responsibility. These actions, it has been argued, increased job satisfaction and performance.

Parsons (1974) presents evidence that the findings of the Hawthorne experiments also can be explained by accompanying changes in the compensation system. Prior to the experiment, all workers were paid based on the output of a group of about 100 workers. During the experiment, the compensation plan was changed to base pay on the output of only five workers. In this case, a given worker's output more directly affects her own pay, and economic theory predicts increased output. Interestingly, the last of the original Hawthorne experiments observed workers where the compensation system was not changed. In that seventh experiment, there was no change in output.

Source: H. Parsons (1974), "What Happened at Hawthorne?" *Science* 183, 922–932.

diverse array of activities. As examples, much of the work through the Red Cross is undertaken by unpaid volunteers; people frequently choose early retirement, walking away from a regular paycheck to enjoy additional leisure time; riskier occupations command higher pay in order to attract people into those jobs.

Some of this confusion can result from a misinterpretation of standard economic analysis. Central to economics is the study of trade-offs (recall our discussion of indifference curves illustrating trade-offs between food and clothing). Economists frequently use money as one of the goods being considered. But in these cases, money is merely a convenient unit of value: It represents general purchasing power. Its use does not suggest that only money matters.

Happy-Is-Productive Model

Managers sometimes assert that happy employees are more productive than unhappy employees. Managers following this happy-is-productive model see as their goal the designing of work environments that satisfy employees. Psychological theories, such as Maslow's and Herzberg's, are frequently used as guides in efforts to increase job satisfaction.¹⁹

A manager adhering to the happy-is-productive model might suggest that the problem at Merrill Lynch was motivated by disgruntled employees who took out their frustrations on customers. This view implies that Merrill Lynch could reduce the problem by promoting employee satisfaction through such actions as designing more interesting jobs, increasing the rates of pay, and improving the work environment. Happier employees would be expected to provide customers with better investment advice.

¹⁹F. Herzberg, B. Mausner and B. Snyderman (1959), *The Motivation to Work* (John Wiley & Sons: New York); and A. Maslow (1970), *Motivation and Personality* (Harper & Row: New York).

The economic and happy-is-productive models do not differ based on what people care about. The economic model allows individuals to value love, esteem, interesting work, and pleasant work environments, as well as more standard economic goods such as food, clothing, and shelter. The primary difference in the models is what motivates individual actions. In the happy-is-productive model, employees exert high effort when they are happy. In the economic model, employees exert effort because of the rewards.

To contrast the two models, consider offering an employee guaranteed lifetime employment plus a large salary, which will be paid independent of performance. The happy-is-productive model suggests that the employee will be more productive, because the additional job security and high salary are likely to increase job satisfaction. The economic model suggests that the employee would exert less effort—since the employee receives no additional rewards for working harder and will not be fired for exerting low effort.

Good-Citizen Model

Some managers subscribe to the good-citizen model. The basic assumption is that employees have a strong personal desire to do a good job; they take pride in their work and want to excel. Under this view, managers have three primary roles. First, they need to communicate the goals and objectives of the organization to employees. Second, they must help employees discover how to achieve these goals and objectives. Finally, managers should provide feedback on performance so that employees can continue to improve their efforts. There is no reason to have incentive pay, since individuals are interested intrinsically in doing a good job.

This view suggests that the problems at Merrill Lynch occurred because employees misunderstood what was good for the company. Employees might have thought that increasing investment banking revenues was in the company's best interests, even if it required a certain amount of dishonesty. Under the good-citizen view, the management of Merrill Lynch could motivate employee honesty by clearly communicating to its analysts that Merrill Lynch would be better off in the long run if they did not deceive their customers. Managers might be instructed to hold a series of analyst meetings to stress the value of honesty and objective investment advice.

In the good-citizen model, employees place the interests of the company first. There is never a conflict between an employee's personal interest and the interest of the company. In contrast, the economic model posits that employees maximize their own utility. Potential conflicts of interest often arise. The economic view predicts that pleas from Merrill Lynch management that analysts be more honest would have little effect on behavior unless they also changed the reward system to make it in the interests of analysts to be more honest.

Product-of-the-Environment Model

The product-of-the-environment model argues that the behaviors of individuals are largely determined by their upbringings. Some cultures and households encourage positive values in individuals, such as industry and integrity, whereas others promote negative traits, such as laziness and dishonesty. This model suggests that Merrill Lynch had dishonest analysts. A response would have been to fire these employees and replace them with honest analysts from better backgrounds.

Economics and Attracting Russian Workers

Near the Arctic Circle, Siberia offers two main seasons: frostbite and mosquito swarms. It also boasts large mineral deposits. Attracting workers to Siberia has been difficult until companies raised salaries. Now, despite its inhospitable climate, private companies draw people to work the giant oil, gold, and diamond deposits with salaries as much as ten times those offered in the rest of the country. With the rest of the economy in shambles where people are sometimes paid in tires and brassieres, Siberia is more enticing with monthly wages of \$720 in cash deposits—about seven times the median Russian salary.

Source: M. Brzezinski (1998), "A Paradise on Ice? Hardly, but to Many, Siberia Is a Hot Spot," *The Wall Street Journal* (July 1), A1.

Which Model Should Managers Use?

Behavior is a complex topic. No behavioral model is likely to be useful in all contexts. For example, the economic model is unlikely to be helpful in predicting whether a given individual will prefer a red shirt to a blue shirt (selling at the same price). But our focus is on managerial decision making. In this context, there are reasons to believe that the economic model is particularly useful.

Managers are frequently interested in fostering changes in behavior. For example, managers want consumers to buy more of their products, employees to exert more effort, and labor unions to accept smaller wage increases. In contrast to other models, the economic framework provides managers with concrete guidance on how to alter behavior. Desired behavior can be encouraged by changing the relevant costs and benefits facing the decision maker. For example, incentive compensation can be used to motivate employees, and price changes can be used to affect consumer behavior.

There is ample evidence to support the hypothesis that this economic framework is useful in explaining changes in behavior. The most common example is that consumers tend to buy fewer products at higher prices. The evidence suggests that the model is also useful in explaining aspects of behavior in many other contexts, including voting; the formation, dissolution, and structure of families; drug addiction; and the incidence of crime.²⁰

The Economic Framework and Criminal Behavior

Criminals often are viewed as psychologically disturbed. Evidence, however, suggests that criminal behavior can be explained, at least in part, by the economic framework. This framework predicts that a criminal will consider the marginal costs and benefits of a crime and will commit the crime only when the benefits exceed the costs. Under this view, increasing the likelihood of detection and/or the severity of punishment will reduce crimes. In a pioneering study, Isaac Ehrlich examined whether the incidence of major felonies varied across states with the expected punishment. He found that the incidence of robberies decreased about 1.3 percent in response to each 1 percent increase in the proportionate likelihood of punishment. The incidence of crime also decreased with the severity of the punishment. Since Ehrlich's study, scholars have conducted extensive research on this topic. In general, the results support the conclusion that the economic model plays a useful role in predicting criminal activity.

Source: I. Ehrlich (1973), "Participation in Illegitimate Activities: A Theoretical and Empirical Investigation," *Journal of Political Economy* 81, 521–565.

²⁰G. Becker (1993).

Criticisms of the Happy-Is-Productive Model

W. Richard Scott summarizes some of the major concerns about the happy-is-productive model (sometimes referred to as the human-relations movement):

Virtually all of these applications of the human-relations movement have come under severe criticism on both ideological and empirical grounds. Paradoxically, the human-relations movement, ostensibly developed to humanize the cold and calculating rationality of the factory and shop, rapidly came under attack on the grounds that it represented simply a more subtle and refined form of exploitation. Critics charged that workers' legitimate economic interests were being inappropriately deemphasized; actual conflicts of interest were denied and "therapeutically" managed; and the roles attributed to managers represented a new brand of elitism. The entire movement was branded as "cow sociology" just as contented cows were alleged to produce more milk, satisfied workers were expected to produce more output.

The ideological criticisms were the first to erupt, but reservations raised by researchers on the basis of empirical evidence may in the long run prove to be more devastating. Several decades of research have demonstrated no clear relation between worker satisfaction and productivity.

Source: W. Scott (1981), *Organizations: Rational, Natural and Open Systems* (Prentice Hall: Englewood Cliffs, NJ), 89–90.

The good-citizen model appears less successful in predicting behavior in business settings. Management would be an easy task if employees would work harder and produce higher-quality products simply on request. The happy-is-productive model also has material limitations. Most importantly, the existing evidence suggests that there is little relation between job satisfaction and performance (see Scott's "Criticisms of the Happy-Is-Productive Model" in the accompanying box). Happy employees are not necessarily more productive. Sometimes, managers might want to follow the implications of the product-of-the-environment model and fire employees with undesirable traits. Yet, this approach is unlikely to be useful in solving most managerial problems. Also, given laws that limit discrimination, this approach can subject the firm to potentially serious legal sanctions.

Decision Making under Uncertainty

Throughout this chapter, we have considered cases where the decision maker has complete certainty about the items of choice. For instance, Dom Lalisie knew the exact prices of food and clothing, and Sue Chen knew the precise trade-off between integrity and compensation at Merrill Lynch. Decision makers, however, often face uncertainty. For instance, in choosing among risky investment alternatives (such as stocks and bonds), an individual must forecast the likely payoffs. Even so, there can be significant uncertainty about the eventual outcomes. The analysis presented in this chapter can be extended readily to incorporate decision making under uncertainty.²¹ A detailed analysis of decision making under uncertainty is beyond the scope of this book. This section introduces a few key concepts that we will use later in this book.

Expected Value

Taylor McClure sells real estate for RealCo. He receives a sales commission from his employer. For simplicity, suppose that Taylor has three possible incomes for the year.

²¹For example, E. Fama and M. Miller (1972), *The Theory of Finance* (Dryden Press: New York), Chapter 5.

In a good year, he sells many houses and earns \$200,000, whereas in a bad year he earns nothing. In other years, he receives \$100,000. Probability refers to the likelihood that an outcome will occur. In this example, each outcome is equally likely, and thus has a probability of 1/3 of occurring. The *expected value* of an uncertain payoff is defined as the weighted average of all possible outcomes, where the probability of each outcome is used as the weights. The expected value is a measure of central tendency—the payoff that will occur on average. In our example, the expected value is:²²

$$\begin{aligned}\text{Expected value} &= (1/3 \times 0) + (1/3 \times 100,000) + (1/3 \times 200,000) \\ &= \$100,000\end{aligned}\quad (2.6)$$

Variability

Although Taylor can expect average earnings of \$100,000, his income is not certain. The *variance* is a measure of the variability of the payoff. It is defined as the expected value of the squared difference between each possible payoff and the expected value. In this example, the variance is

$$\begin{aligned}\text{Variance} &= 1/3(0 - 100,000)^2 + 1/3(100,000 - 100,000)^2 \\ &\quad + 1/3(200,000 - 100,000)^2 \\ &= 6.7 \text{ billion}\end{aligned}\quad (2.7)$$

The *standard deviation* is the square root of the variance:

$$\text{Standard deviation} = (6.7 \text{ billion})^{1/2} = \$81,650 \quad (2.8)$$

Variances and standard deviations are used as measures of risk. It does not really matter which we use, since one is a simple transformation of the other (higher standard deviations correspond to higher variances). In this example, we focus on the standard deviation—in part because the standard deviation is expressed in the same units as the mean, dollars (the units for the variance would be dollars squared). Higher standard deviations reflect more risk. An event with a definite outcome has a standard deviation of zero.

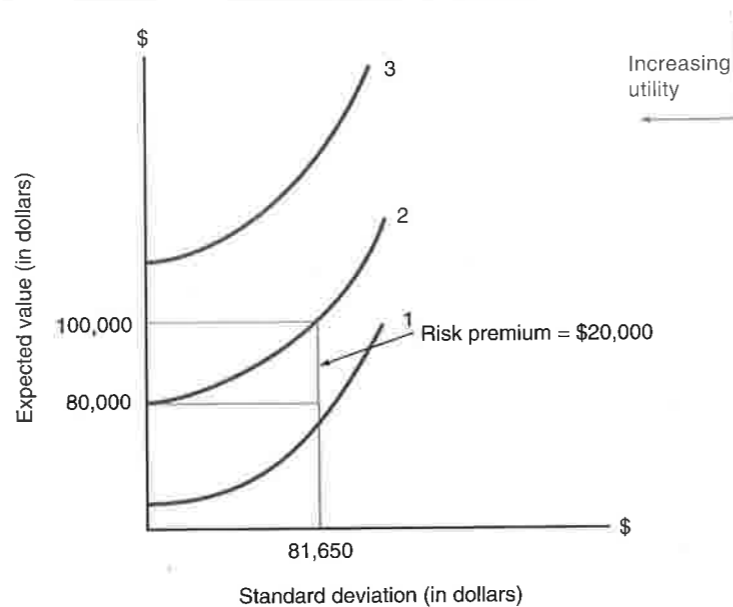
Risk Aversion

Like most people, Taylor is *risk-averse*: Holding the expected payoff fixed, he prefers a lower standard deviation. He therefore gains utility from an increase in expected value, but he experiences a reduction in utility from increases in standard deviation. Figure 2.9 shows three of Taylor's indifference curves. Each curve shows all combinations of expected value and standard deviation that give Taylor equal utility. In contrast to our previous analysis, here one of the objects of choice is a "bad"—Taylor does not like risk. Thus, in this figure, the indifference curves have positive slopes, and northwest movements are utility-increasing (recall in the standard analysis that the curves have negative slopes, and northeast movements are utility-increasing). The slopes of the indifference curves indicate Taylor's degree of risk aversion. Steeper slopes translate into higher risk aversion. (If the slopes of the indifference curves are steep, Taylor must receive a relatively large increase in expected value for each additional unit of risk to maintain a

²²Note that the expected value need not equal one of the possible outcomes. As a weighted average, it can be a value between outcomes. In this example, it happens to correspond to one of the possible outcomes, \$100,000.

Figure 2.9 Indifference Curves for Expected Value and Standard Deviation

This figure displays three indifference curves for a *risk-averse* individual. The individual prefers higher expected value but lower standard deviation. Standard deviation is a measure of risk. Since risk is a “bad,” the indifference curves are positively sloped. Northwest moves are utility-increasing. Currently, the individual has a compensation package that has an expected value of \$100,000 and a standard deviation of \$81,650. The *certainty equivalent* of this package is \$80,000. The *risk premium* is \$20,000.



constant level of utility.) If his indifference curves were totally flat, he would be *risk-neutral*. A risk-neutral person cares only about expected value and is indifferent to the amount of risk. Indifference curve 3 is associated with the highest level of utility, whereas curve 1 is associated with the lowest utility. Taylor is currently on curve 2. Given a choice among compensation plans with different expected payoffs and risk, Taylor will choose the combination that places him on the highest attainable indifference curve.

Certainty Equivalent and Risk Premium

Figure 2.9 indicates that Taylor is indifferent between the risky commission scheme, which has an expected payoff of \$100,000 and a certain income of \$80,000. The \$80,000 is Taylor's *certainty equivalent* for the risky income stream—he is willing to trade the uncertain income of \$100,000 for a certain income of \$80,000. The difference between the expected value of the risky income stream and the certainty equivalent is called the *risk premium*. This \$20,000 premium, which comes in the form of a higher expected payoff, must be paid to keep Taylor indifferent between the risky income stream and his certainty equivalent.

Suppose that Taylor receives a job offer from a competing real estate company that would pay him a fixed salary of \$90,000 per year. Taylor considers the new job to be the same as his current job in all dimensions other than the compensation plan. Taylor's current compensation plan will not be sufficient to motivate him to continue to work for RealCo. Even though his current plan has a higher expected payoff, he would prefer the certain \$90,000 to RealCo's risky commission plan. If RealCo wants to retain Taylor, it must offer him a compensation package that provides the same level of utility as the \$90,000 for certain.

Risk Aversion versus Risk Taking

Lauren Arbittier decides to bet \$2,000 on number 35 of the roulette wheel in a Las Vegas casino. Almost immediately she starts to question her decision. Lauren normally is a risk avoider who hardly ever gambles. But she works at Trilogy Software where the CEO understands that taking risks and suffering the consequences are critical to the firm's success. The CEO wants to develop people who take chances. “You don't win points . . . for trying.” Lauren is participating in Trilogy's three-month training program for all new recruits. It educates employees about, among other things, how to evaluate risky projects, not just to immediately accept or reject the project because it is risky. The program also suggests to employees that they will not be rewarded at Trilogy unless they take risks. Thus, although Lauren does not like taking risks, working for Trilogy, she has economic incentives to do so.

Source: E. Ramstad (1998), “High Rollers, How Trilogy Software Trains Its Raw Recruits to Be Risk Takers,” *The Wall Street Journal* (September 21), A1.

Risk Aversion and Compensation

Diversified shareholders, who invest in portfolios of companies, own much of the stock of large firms. Managers are often ill-diversified, having much of their human and financial capital invested in one firm. As we will discuss later in this book, this difference

CASE STUDY: Interwest Healthcare Corp.

Interwest Healthcare is a nonprofit organization that owns ten hospitals located in three western states. Cynthia Manzoni is Interwest's chief executive officer. Vijay Singh, Interwest's chief financial officer, and the administrators of the ten hospitals report to Manzoni.

Singh is deeply concerned because the hospital staffs are not being careful when entering data into the firm's management information system. This data involves information on patient intake, treatment, and release. The information system is used to compile management reports such as those relating to the costs of various treatments. Also, the system is used to compile reports that are required by the federal government under various grant programs. Singh reasons that without good information, the management and government reports are less useful and potentially misleading. Singh is worried about the managerial implications and the potential loss of federal funds. The federal government periodically audits Interwest and might discontinue aid if the reports are deemed inaccurate.

Singh has convinced Manzoni that a problem exists. She also realizes the importance of an accurate system for both management planning and maintaining federal aid. Six months ago, she invited the

hospital administrators and staff members from the corporate financial office to a retreat at a resort. The purpose was to communicate to the hospital administrators the problems with the data entry and to stress the importance of doing a better job. The meeting was acrimonious. The hospital people accused Singh of being a bureaucrat who did not care about patient services. Singh accused the hospital staffs of not understanding the importance of accurate reporting. By the end of the meeting, Manzoni thought that she had a commitment by the hospital administrators to increase the accuracy of data entry at their hospitals. However, six months later, Singh claims that the problem is as bad as ever.

Manzoni has hired you as a consultant to analyze the problem and to make recommendations that might improve the situation.

Discussion Questions

1. What are the potential sources of the problem?
2. What information would you want to analyze?
3. What actions might you recommend to increase the accuracy of the data entry?
4. How does your view of behavior affect how you might address this consulting assignment?

in diversification can lead to managers being overly risk averse in their investment decisions relative to those shareholders would prefer. Shareholders can induce managers to undertake more risky investment by adopting compensation plans that reward good outcomes, but that do not penalize bad outcomes heavily. The top management of Enron (see Chapter 1) arguably went too far in this direction, inducing their managers to take too much risk (effectively transforming their behavior from risk averse to “risk loving”).²³ We expand on this issue later in the book.

Summary

In this chapter we summarize the way economists view behavior. In the economic model, individuals are seen as having unlimited wants but limited resources. They rank alternative uses of limited resources in terms of preference and choose the most preferred alternative. Individuals are clever in figuring out ways of maximizing their utility (happiness) in the face of resource constraints. Individuals are not necessarily selfish in the sense that they care only about their personal wealth: They also care about charity, family, religion, and society. They are not infallible supercomputers.

The *opportunity cost* of using a resource is the value of the resource in its best alternative use. For example, the cost of having a manager use five hours to work on a project is the value of the manager’s time in working on the next best alternative project. Economic decision making requires careful consideration of the relevant opportunity costs.

Marginal costs and benefits are the incremental costs and benefits that are associated with a decision. In calculating marginal costs, it is important to use the opportunity costs of the incremental resources. For example, in deciding whether to purchase a new laptop computer, the marginal cost is its price and the marginal benefit is the value that the person places on the new computer. It is the marginal costs and benefits that are important in economic decision making. Action should be taken when the marginal benefits are greater than the marginal costs. *Sunk costs* that are not affected by the decision (for example, unrecoverable funds previously spent on computers) are not relevant.

A *utility function* is a mathematical function that relates total utility to the amounts that an individual has of whatever items the individual cares about (*goods*). Preferences implied by a utility function are pictured graphically by *indifference curves*. Indifference curves picture all combinations of goods that yield the same level of utility. Individual choice involves maximizing utility given resource *constraints*. Graphically, the constraint shows all combinations of goods that are feasible to acquire. The optimal choice is where the indifference curve is tangent to the constraint. At this point, the individual is at the highest level of utility possible given the constraint.

Changes in the constraint result in changes in the optimal choice. An important implication is that managers can affect behavior by affecting constraints. Managers, however, have to be careful. Individuals are clever at maximizing their utility, and setting the wrong incentives can have perverse consequences.

We contrast the economic model with other models of human behavior that managers often use. We argue that the economic model is often more useful than alternative models in managerial decision making.

The analysis in this chapter can be extended to the case where the decision maker faces uncertainty about the items of choice. An example of decision making under

²³Most managers have risk-averse preferences (utility functions). Managerial actions, however, are a function of both preferences and constraints. Thus risk-averse preferences can be offset or reinforced by the design of the compensation plan. Compensation plans that limit the upside potential but not the downside effectively make people more risk averse, whereas plans that limit the downside but not the upside make them effectively less risk averse.

uncertainty is choosing among risky investment alternatives. One concept that we will rely on later in this book is *risk aversion*. When confronted with both a risky and a certain alternative having the same expected (or average) payoffs, a risk-averse person always will choose the certain outcome. A *risk premium* must be offered to entice the person to choose the risky alternative.

Throughout this chapter, we focus primarily on how managers might use the economic view to analyze and influence the behavior of employees. As we will see, the economic view is quite powerful and is useful in explaining behavior in a variety of different contexts.

Suggested Readings

- G. Becker (1993), “Nobel Lecture: The Economic Way of Looking at Behavior,” *Journal of Political Economy* 101, 385–409.
M. Jensen and W. Meckling (1994), “The Nature of Man,” *Journal of Applied Corporate Finance* 7, 4–19.

Review Questions

- 2-1. Which costs are pertinent to economic decision making? Which costs are *not* relevant?
- 2-2. A noted economist was asked what he did with his “free time.” He responded by saying that “time is not free.” Explain this response.
- 2-3. The Solace Company has an inventory of steel that it originally purchased for \$20,000. It currently has an offer to sell the steel for \$30,000. Should Solace’s management agree to sell? Explain.
- 2-4. Suppose Juan’s utility function is given by $U = FC$, where F and C are the two goods available for purchase: food and clothing.
 - a. Graph Juan’s indifference curves for the following levels of utility: 100, 200, and 300.
 - b. Are these curves convex or concave to the origin? What does this shape imply about Juan’s willingness to trade food for clothing?
 - c. Suppose Juan’s budget is \$100 and the prices of F and C are both \$5. Graph the budget constraint.
 - d. How many units of food and clothing will Juan purchase at these prices and income? Show graphically. What is his corresponding level of utility?
 - e. The Johnson Company is the sole producer of clothing. What can the company do to induce Juan to purchase more clothing? Show graphically. (The graph does not have to be exact.)
- 2-5. Suppose that Bob’s indifference curves are straight lines (as opposed to being convex to the origin). What does this imply about Bob’s willingness to trade one good for the other? Give examples of goods where this type of behavior might be expected?
- 2-6. Suppose that Bob’s indifference curves are perfectly L-shaped with the right angle occurring when Bob has equal amounts of both goods. What does this imply about Bob’s willingness to trade one good for the other? Give examples of goods where this type of behavior might be expected?
- 2-7.
 - a. Briefly describe the five models of behavior presented in this chapter.
 - b. What are the implications of these models for managers attempting to influence their employees’ behavior?
- 2-8. Employees in a plant in Minnesota are observed to be industrious and very productive. Employees in a similar plant in southern California are observed to be lazy and unproductive. Discuss how alternative views of human behavior and motivation might suggest different explanations for this observed behavior.
- 2-9. Employees at a department store are observed engaging in the following behavior: (a) they hide items that are on sale from the customers, and (b) they exert little effort in designing merchandise

displays. They are also uncooperative with one another. What do you think might be causing this behavior, and what might you do to improve the situation?

- 2-10.** One of the main tenets of economic analysis is that people act in their own narrow self-interest. Why then do people leave tips in restaurants? If a study were to compare the size of tips earned by servers in restaurants on interstate highways with those in restaurants near residential neighborhoods, what would you expect to find? Why?
- 2-11.** Several school districts have attempted to increase teacher productivity by paying teachers based on the scores their students achieve on standardized tests (administered by outside testing agencies). The goal is to produce higher-quality classroom instruction. Do you think that this type of compensation scheme will produce the desired outcome? Explain.
- 2-12.** A company recently raised the pay of employees by 20 percent. Employee productivity remained the same. The CEO of the company was quoted as saying, "It just goes to show that money does not motivate people." Provide a critical evaluation of this statement.
- 2-13.** One physician who worked for a large health maintenance organization was quoted as saying:
One day I was listening to a patient's heart and realized there was an abnormal rhythm. My first thought was that I hoped that I did not have to refer the patient to a specialist.
 Indeed, HMO physicians have been criticized for not making referrals when they are warranted. How do you think the physician was compensated by the HMO? Explain.
- 2-14.** Insurance companies have to generate enough revenue to cover their costs and make a normal profit—otherwise, they will go out of business. This implies that the premiums charged for insurance policies must be greater than the expected payouts to the policyholders. Why would a person ever buy insurance, knowing that the price is greater than the expected payout?
- 2-15.** Critically evaluate the following statement: "Risk-averse people never take gambles."
- 2-16.** Suppose that an investment can yield three possible cash flows: \$5,000; \$1,000; or \$0. The probability of each outcome is $1/3$.
 a. What is the expected value and standard deviation of the investment?
 b. How much would a risk-neutral person be willing to pay for the investment?
 c. How much would a risk-averse person be willing to pay for the investment?
- 2-17.** In order to spur consumer spending in 1998, the Japanese government considered an \$85 billion voucher system whereby every Japanese consumer would receive a shopping voucher that could be used to purchase Japanese products. For simplicity, assume the following: each consumer has wealth of 1 million yen, consumers must allocate this wealth between consumption now (c_1) and consumption later (c_2), the interest rate is zero, the voucher is worth 100,000 yen, and it can be spent only in the current period. If it is not spent, it is lost.
 a. Plot a budget line for a representative consumer both before and after the voucher program (c_1 and c_2 are on the axes).
 b. Do you expect that current consumption of a typical consumer will increase by the full 100,000 yen of the voucher? Explain.
 c. How does the impact of this 100,000-yen voucher differ from simply giving the individual 100,000 yen?
- 2-18.** Refer to the box titled, "Risk Aversion versus Risk Taking." There are at least three ways in which the Trilogy training program might be effective: (1) It changes employees' preferences regarding risk bearing. (2) It more effectively identifies individuals with the risk to tolerances that Trilogy desires. (3) It better communicates the consequences to Trilogy employees of undertaking risky ventures. Discuss the likely importance of these three mechanisms.
- 2-19.** People give to charity.
 a. Is this action consistent with the "economic view of behavior"? Explain.
 b. Suppose there is a big drop in charitable giving. At the same time there has been no decline in per capita income or total employment. Using the economic model, what potential factors might have led to this decline in giving?
 c. How might the decline in giving be explained by the product-of-the environment model?

- 2-20.** Some states in the United States allow citizens to carry handguns. Citizens can protect themselves in the case of robberies by using these guns. Other states do not allow citizens to carry handguns. Criminals, however, tend to have handguns in all states. *Use economic analysis* to predict the effects of handgun laws on the behavior of the typical criminal. In particular:
 (1) Do you think criminals will commit more or fewer robberies in the states with the laws?
 (2) How do you think the laws will affect the *types of robberies* criminals commit? Be sure to explain your *economic reasoning*.
- 2-21.** Discuss the following statement: "Sunk costs matter. People who pay \$20,000 to join a golf club play golf more frequently than people who play on public golf courses."
- 2-22.** Jenny is an investor in the stock market. She cares about both the expected value and standard deviation of her investment. Currently she is invested in a security that has an expected value of \$15,000 and a standard deviation of \$5,000. This places her on an indifference curve with the following formula: Expected Value = \$10,000 + Standard Deviation.
 a. Is Jenny risk averse? Explain.
 b. What is Jenny's "certainty equivalent" for her current investment? What does this mean?
 c. What is the risk premium on her current investment?
- 2-23.** Accounting problems at Enron ultimately led to the collapse of the large accounting firm Arthur Andersen. When the Enron scandal first became public, Andersen's top management blamed one "rouge partner" in the Houston office who they claimed was less honest than other partners at the firm. They fired the partner and asked that people not hold the remaining partners accountable for "one bad apple." What model of behavior was Andersen's management using when it analyzed the source of the problem? According to the economic view of behavior, what was the more likely cause of the problem?