Managerial Economics and Organizational Architecture 7th edition Brickley Solutions Manual

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Solutions Manual

to accompany

Managerial Economics and Organizational Architecture, 7e

Answers to "Analyzing Managerial Decisions" Discussion Questions

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Chapter 1: Introduction

SOCIÉTÉ GÉNÉRALE

Discussion Question Answers:

1. It is true that the Société Générale employee traded on behalf of the bank and that any of the direct gains and losses from the transactions would go to the bank not the employee. This does not, however, necessarily imply that the trader was acting "irrationally" in placing the bets. It is likely that at least part of his bonus was either directly or indirectly tied to his performance as a trader. Also his performance could affect his prospects for proportions to higher level positions and compensation at the bank. While the trader's compensation may be small from the standpoint of the bank, it was likely important to him. Clearly the trader's actions were risky and have legal implications. Nevertheless, he could have concluded that the prospects of a higher bonus and promotion outweighed the costs. He apparently had confidence that the European stock market would increase over time. His knowledge of the control system helped him to conceal the transactions and reduce the likelihood that his actions would be detected. Indeed his actions were only discovered after a huge and rather unusual on day drop in European stock prices of nearly 6%. While his actions could be characterized as risky and apparently illegal, it is not clear that they were completely "irrational."

2. The example raises managerial questions about whether it is wise to move an employee with detailed knowledge of the internal controls into a trading position without additional monitoring or better controls. While the details of the fraud at Société Générale were still being investigated, it is plausible that the bank's organizational architecture contributed to the problem – the bank's delegation of decision rights provided the opportunity to undertake the trades, the bank's incentive system may have helped to motivate the improper actions, and the bank's monitoring staff policies could have increased the likelihood that they would not be detected.

3. Annual bonuses and the prospects for promotion provided important incentives in banks and many other organizations. As an executive, you should carefully consider the incentives that are created by your bank's compensation and promotion policies. Even well designed incentive plans can motivate a certain amount of unproductive and even illegal behavior. Reasonable controls and safeguards should be adopted to limit negative behavior. Naïve design of incentives and/or poorly designed controls can be a recipe for disaster. As a manager it is important you consider these issues before the problems arise. A primary purpose of this book is help managers become better designers of organization architecture.

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Chapter 2: Economists' View of Behavior

MARGINAL ANALYSIS

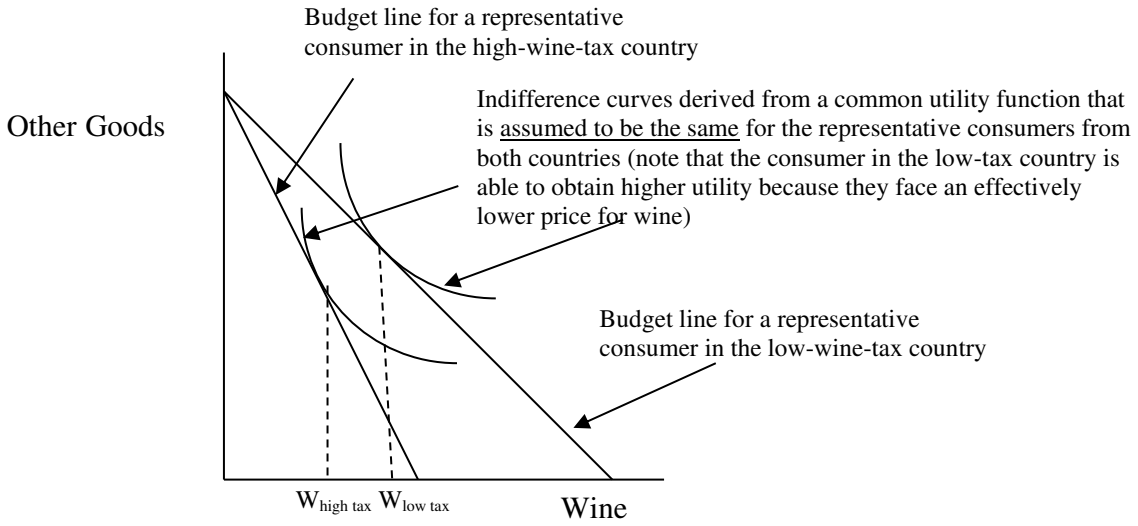
Discussion Question Answers:
1. The marginal (incremental) benefit of this transaction is the $600 of increased revenue. You need to calculate your marginal (incremental) costs to decide if you should accept or reject the proposed deal.
2. The monthly lease and insurance expenses are not incremental, but sunk (you pay them whether you take the deal or not). You expect that the trucker will use the 100 gallons of fuel. The fuel can be replaced for $3.25 per gallon for a total cost of $325. The retail price of $4.00 per gallon is irrelevant since the transaction does not affect the amount of fuel that you can sell to your other customers. You have to pay $.50 to the lease company for every mile that the customer drives the truck. The customer will pay this cost once he reaches 500 miles. You are responsible for paying for the first 500 miles, which has a total cost of $250. You have no other use for the truck for the week and thus there are no additional opportunity costs. Given these considerations, the total marginal cost is $575 (the $325 fuel costs plus the $250 mileage cost). The marginal benefit exceeds the marginal costs by $25 and you should accept the deal. Your optimal course of action could change if you faced a limit on wholesale fuel purchases. It depends on whether this restriction is "binding" in the sense that your allotted amount of fuel limits the amount of fuel you can sell to your retail customers. For example, suppose that the restriction is binding and that you could have sold the 100 gallons of fuel used by the rental customer to retail customers for $4.00 per gallon. The opportunity cost of the fuel under this scenario is $400 and the marginal cost of the proposed deal is $650. In this case it is no longer optimal to accept the proposal.

CONSUMER CHOICE AND GRAPHICAL TOOLS

Discussion Question Answers:
A potential economic explanation for the differences in wine consumption in the two countries is that one country has a higher tax rate on wine than the other. Holding income and preferences constant across the two countries, you would expect to observe lower wine consumption in the country with the higher tax rate. This is illustrated by the following graph:

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Prior to collecting any "real world" data your economic explanation is simply a plausible theory. Before you take any action you should consider whether there is any data that you could use to help confirm the validity of your explanation. For example, at a minimum you would want to determine whether the tax rates are actually different in the two countries. It might also be useful to examine data across a larger sample of countries to help confirm that there is a negative relation between tax rates and wine consumption across countries. Other possible data and analysis could be useful. You should also consider whether there are any other plausible explanations that could explain the differences in wine consumption (e.g., differences in the legal drinking ages, differences in the age composition of the populations, etc.) and determine whether there is any data that you could use to distinguish among the alternative explanations. For example, there might be differences in the legal drinking ages between the two countries, but data suggests that few youthful legal drinkers consumer wine (for example, they consume primarily beer). This book focuses on economic theory, not data analysis. However, it is important to note that it is usually important for managers to rely on both theory and data in decision making. Data analysis, while beyond the scope of this book, is typically an important component of business and economic education.

1. Now suppose that you have determined that the likely cause is the difference in tax rates, there are at least two actions that you might take to increase wine sales in the country with the higher tax rate. First, you might bottle the wine in larger bottles. The tax is on a per bottle basis and thus the customer pays a lower tax per unit of volume when the wine is sold in large bottles. This strategy is an example of being creative in getting around constraints. Second, perhaps you can devise a strategy to influence the relevant politicians/regulators to lower the tax rate on wine in the high-tax country. As we discuss later in this book, politicians and regulators can often be influenced by lawful actions of powerful business and lobby groups.

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2. A preferences-based explanation for the differences in consumption between the two countries would focus on potential differences in tastes and preferences between the citizens of the two countries. For example, one country might be populated by people who have strong cultural or religious conditioning against consuming alcohol, while people from the other country are known to "enjoy a bottle of wine with every dinner." Changing people's preferences can be difficult and so it is often useful to look at potential economic explanations first (since a manager typically has more control over changing constraints than preferences). Also it is often difficult to collect data to determine whether differences in preferences actually are driving the differences in consumer behavior. That said, consumer choice is determined by both constraints and preferences and sometimes differences in behavior are driven by differences in preferences (or a combination of differences in constraints and preferences). Depending on the differences in preferences across potential customers, it may be possible to develop productive managerial responses. For example, suppose that you determine that the consumers in one country are not buying your red wine products because they prefer white wine to red wine (perhaps because of the type of food that they consume). You might correspondingly increase wine sales by exporting more white wine to the country and changing your advertising to correspond with your new product offerings.

INTERWEST HEALTHCARE CORP

Discussion Question Answers:
1. This case is based on an actual business. The real CEO subscribed to the "good citizen model." He reasoned that the hospital administrators did not understand the importance of accurate information reporting to the company.
2. He had several meetings and retreats with the relevant employees. He encouraged accurate reporting, stressed its importance, and motivated face-to-face meetings between hospital and corporate personnel. None of these actions had the desired effect.
3. The economic view of behavior suggests that he should have looked at the incentives of the employees. As it turns out, the corporate finance employees had strong incentives to want accurate reporting. If the auditors found flaws in the information/accounting system they would receive the primary criticism and were likely to lose their jobs. The hospital administrators were not evaluated or rewarded based on the accuracy of the system. Rather, their primary concerns were meeting budgets, keeping doctors happy, and avoiding lawsuits and bad press.
4. To motivate increased concern about the information system among hospital administrators, the CEO should carefully evaluate the current incentive structure for the hospital administration and change it — placing increased emphasis on financial/information reporting.

RISK AVERSION VERSUS RISK TAKING

Discussion Question Answers:
It is generally difficult to change a person's preferences toward risk. A short experience

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in gambling is unlikely to do so. The training program might identify individuals with risk tolerances Trilogy desires. However, the people are already hired and this is unlikely to be the major reason for the program. Also, employees have incentives to behave in a risky manner in the program and it might be hard to discern underlying preferences of individuals from their actions. The program does a relatively effective job of communicating that risk taking is valued at the company. In addition, it gives the employees experience in evaluating risky alternatives.

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CHAPTER 1

INTRODUCTION

CHAPTER SUMMARY

This chapter introduces the book. It begins with the poor management of Volkswagen that started in 2011. This example illustrates how a company's organizational design is affected by bad management which ultimately affects the company's financial targets. It points to three critical elements of organizational design, which we refer to as *organizational architecture*. These elements include the assignment of decision rights, the reward system, and performance evaluation system. The chapter discusses the basic ideas behind economic analysis and how this framework can be used by managers to make better organizational, production, and pricing decisions. The chapter introduces the important concept of economic Darwinism.

CHAPTER OUTLINE

MANAGERIAL ECONOMICS AND ORGANIZATIONAL ARCHITECTURE
- Organizational Architecture
- *Academic Applications—R&D and Executive Turnover*
- Economic Analysis
- *Managerial Applications— Creative Responses to a Poorly Designed Incentive System*

ECONOMIC DARWINISM
- Survival of the Fittest
- Economic Darwinism and Benchmarking
- *Managerial Applications— Economic Darwinism: The Growth in Lead Directors*

PURPOSE OF THE BOOK
- Our Approach to Organizations
- *Analyzing Managerial Decisions—Société Générale*

LEARNING OBJECTIVES

1. Define organizational architecture and discuss how economics can be used to help managers solve organizational problems and structure more effective organizational architectures.
2. Define economic Darwinism and discuss its implications related to the benchmarking of business practices.

TEACHING THE CHAPTER

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Chapter 1 is an important chapter since it introduces the perspective that is used throughout the rest of the text. There are several *Managerial Applications* that can be used to generate class discussion. The examples from this chapter can also be referred to as these concepts are reintroduced later in the text.

There are two *Self-Evaluation Problems* and three *Review Questions* at the end of the chapter that can be used for class discussion to determine whether students understand the fundamental concepts of the chapter before discussing the ***Analyzing Managerial Decisions*** scenario presented at the end of the chapter.

The ***Analyzing Managerial Decisions*** scenario presented in the chapter, *"Société Générale"*, is a comprehensive scenario that asks students to evaluate the organizational architecture of the firm and the role its architecture played in allowing the events to transpire. (See the Solutions Manual for the answers to the ***Analyzing Managerial Decisions*** problems).

REVIEW QUESTIONS

1–1— What are the three aspects of *organizational architecture?*

The assignment of decision rights, the reward system, and the performance-evaluation system.

1–2— In the process of benchmarking, a colleague of yours notes that Lincoln Electric, a producer of electric arc welders, has much higher productivity than does your company. Unlike your firm, Lincoln has an extensive piece-rate compensation system; much of its employees' total compensation is simply the number of units produced times the piece rate for that type unit. Your colleague recommends that your company adopt a piece-rate compensation system to boost productivity. What do you advise?

Piece rates are one part of Lincoln Electric's organizational architecture. Piece rates work well for them because they fit well with Lincoln's particular economic environment, business strategy, and other elements of the organizational architecture. It might be inappropriate to use Lincoln Electric as a benchmark if the firm is in a different environment or has a different business strategy. (Lincoln Electric will be discussed in more detail in Chapter 16.)

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1–3— In the life insurance industry, we see two major ownership structures—common stock insurers and mutual insurers. In a common stock company, the owners—its stockholders—are a separate group from its customers—the policyholders. In a mutual, the policyholders are also the owners of the company. It has been argued that mutual insurance companies are dinosaurs—they are large, slow, bureaucratic, and inefficient. How would you respond to such an argument?

The initial reaction to this argument should be skepticism. Mutual insurance companies have existed for a long time in a competitive environment and thus are likely to have been an efficient form of organization in the past (economic Darwinism). It is possible that the environment has changed in a manner to make this form of organization undesirable. However, before this argument is accepted, it is important to identify these changes and to analyze carefully why mutual insurance companies are unlikely to survive in the changed environment.

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CHAPTER 2

ECONOMISTS' VIEW OF BEHAVIOR

CHAPTER SUMMARY

This chapter uses the improper account openings at Wells Fargo to illustrate how a manager's view of behavior can affect decision making. It summarizes the economic view of behavior and contrasts it with other views. The chapter presents a graphical analysis of utility maximization and decision making under uncertainty. The concepts in this chapter are an important foundation for subsequent material in the book. Appendix A more fully covers the mathematics of consumer choice theory, including income and substitution effects, and the derivation of the equal marginal principle. Appendix B focuses on modeling intertemporal choice and the Fisher Separation Theorem.

CHAPTER OUTLINE

ECONOMIC BEHAVIOR: AN OVERVIEW
- Economic Choice
- Marginal Analysis
- *Managerial Applications—Marginal Analysis of Customer Profitability*
- *Managerial Applications—Opportunity Costs and V-8*
- Opportunity Costs
- Creativity of Individuals
- *Analyzing Managerial Decisions—Marginal Analysis*
- *Managerial Applications—How Food Companies Game U.S. Government Food Labeling Rules*

GRAPHIC TOOLS
- Individual Objectives
- Indifference Curves
- Opportunities and Constraints
- Individual Choice
- Changes in Choice
- *Analyzing Managerial Decisions—Consumer Choice and Graphical Tools*

MOTIVATING HONESTY AT WELLS FARGO
- *Managerial Applications—Employee Theft Shatters Trust when Good Workers Go Bad*
- *Managerial Applications—More to Life than Money*

MANAGERIAL IMPLICATIONS

ALTERNATIVE MODELS OF BEHAVIOR
- Only-Money-Matters Model
- Happy-Is-Productive Model

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Managerial Applications—Happy-Is-Productive versus Economic Incentives—The Affordable Care Act
Good-Citizen Model
Product-of-the-Environment Model
WHICH MODEL SHOULD MANAGERS USE?
Academic Applications—Criticisms of the Happy-Is-Productive Model
Analyzing Managerial Decisions—Interwest Healthcare Corp.
BEHAVIORAL ECONOMICS
DECISION MAKING UNDER UNCERTAINTY
Expected Value
Variability
Risk Aversion
Analyzing Managerial Decisions—Risk Aversion versus Risk Taking
Certainty Equivalent and Risk Premium
Risk Aversion and Compensation
Managerial Applications—Plants and Risk

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Marginal Utility
Slope of an Indifference Curve
Individual Choice
Solving for the Optimal Consumption Bundle
Demand Functions
Income and Substitution Effects
Magnitude of the Substitution Effect
Additional Considerations
Calculus Derivation of the Equal Marginal Principle
Managerial Applications—That Coffee Taste State? It Could Be Nine Years Old
Analyzing Managerial Decisions—Consumer Choice
APPENDIX B: INTER-TEMPORAL DECISIONS AND THE FISHER SEPARATION THEOREM
Simple Example of Inter-Temporal Choice
Fisher Separation Theorem

LEARNING OBJECTIVES

1. Describe the economic model of behavior.
2. Define and apply marginal analysis in managerial decisions.
3. Define and apply the concept of opportunity costs.
4. Use graphs to explain, predict, and affect behavior in a wide range of applications.
5. Contrast the implications of the economic model with those from other behavioral models used by some managers.
6. Identify the key concepts that are used to mitigate risk when making decisions under uncertainty.

TEACHING THE CHAPTER

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This chapter begins to focus on the economic tools that are used throughout the rest of the text. Depending upon the background of the students who are in the class and the importance of the topic to the overall goals of the course, instructors will need to spend varying amounts of time on this chapter and will opt to cover Appendix A in varying levels of detail. The utility-maximization framework is presented graphically and numerically, with a detailed presentation included in the appendix. Undoubtedly, this concept is the most difficult part of the chapter but this economic model is vital to understand. It is imperative that students not only understand how the tools are used for quantitative and graphical analysis, but also why these tools represent the concepts they are used to portray (such as opportunity cost). The remaining concepts of the chapter are not technical in nature so instructors can make use of the *Managerial Applications* to generate class discussion of these topics rather than lecturing on them. Alternative views of behavior are presented and their resulting managerial implications can be used for class discussion. The last section of the chapter focuses on how decisions are made when individuals face uncertainty.

The *Self-Evaluation Problems* cover some of the quantitative tools introduced in the chapter, including consumer choice analysis, but there are numerous *Review Questions* that also cover the quantitative analysis and key concepts. It would be worthwhile to devote time in class to these questions since this chapter is the foundation for many of the chapters that follow.

There are five ***Analyzing Managerial Decisions Scenarios*** presented in the chapter, four in the chapter and one in Appendix A. The first scenario, *"Marginal Analysis"*, is based on determining the relevant costs that should be considered when making decisions. The second scenario, *"Consumer Choice and Graphical Tools"*, asks students to graph indifference curves and budget constraints to explain the scenario. This scenario relies on graphical analysis of the problem, not a quantitative analysis. It also highlights the relationship between the economic model and what it represents. The third scenario, *"Interwest Healthcare Corp."* asks students to consider the motivations for the workers who are not properly completing their tasks and how this behavior might be changed. The fourth scenario, *"Risk Aversion versus Risk Tasking"*, focuses on differences in behavior due to individuals' varying levels of risk tolerance. This concept is important since it resurfaces in several chapters throughout the text. The final scenario, *"Consumer Choice",* is located at the end of the chapter after Appendix A. This scenario focuses on the quantitative analysis of consumer choice. Instructors should review this scenario and determine its relevancy to the course since it involves more complicated mathematical analysis than will be used in the rest of the text. However, instructors whose students have the appropriate mathematical background will likely want to review this scenario. (See the Solutions Manual for the answers to the ***Analyzing Managerial Decisions*** problems).

REVIEW QUESTIONS

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Note: Questions 2-29 and 2-32 require knowledge about the relationship between opportunity cost and comparative advantage, including how these concepts are shown graphically on a production possibilities frontier. Students who have previously completed an introductory level course should be familiar with these concepts but they are covered in detail in this book in chapter 3 (see pages 68-72).

2–1. Which costs are pertinent to economic decision making? Which costs are *not* relevant?

The marginal (incremental) costs and benefits are pertinent to economic decision making. Sunk costs and benefits are not relevant. In economics, "bygones are forever bygones."

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.

Time is finite. If it is used for one activity it cannot be used for another activity. Thus using time for one activity involves an opportunity cost (the value of using the time for the best alternative use). For example, if you spend an hour of time managing your own business when you could have used the hour to earn $20 working for someone else, the opportunity cost of working in your own business is $20/hour.

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.

You cannot answer this question without additional information. The historic cost of the steel is irrelevant. What is important is the current opportunity cost of the steel. For example, if the current market price of steel is $40,000 you should not sell the steel for $30,000.

2-4. Suppose that you have $900 and what to invest the money for one year. There are three existing options.

(a) The city of Rochester is selling bonds at $90 per unit. The bonds pay $100 at the end of one year when they mature (no other cash flows).

(b) Put the money under your mattress.
(c) The one-year interest rate of saving in the Chase Bank is 7 percent.

(d) Which one will you choose? What is the opportunity cost of your choice? Explain.

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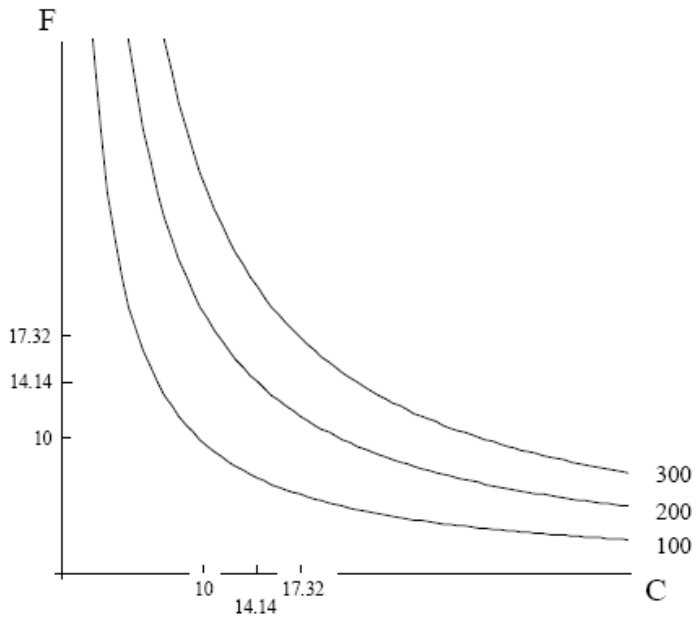
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Choose option (a). By definition, opportunity cost is the value of the best foregone option. So the opportunity cost of (a) is the value of (c) in this case, $\$63 = \$900 \times 7\%$.

2-5. 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.

Juan's indifference curves for U = 100, 200 and 300 are pictured as follows. The general formula for the graph of an indifference curve for a given level of utility, U*, is F=U*/C (since U* = F x C). For example, the indifference curve for U* = 100 is given by the formula: F = 100/C.



b. Are these curves convex or concave to the origin? What does this shape imply about Juan's willingness to trade food for clothing?

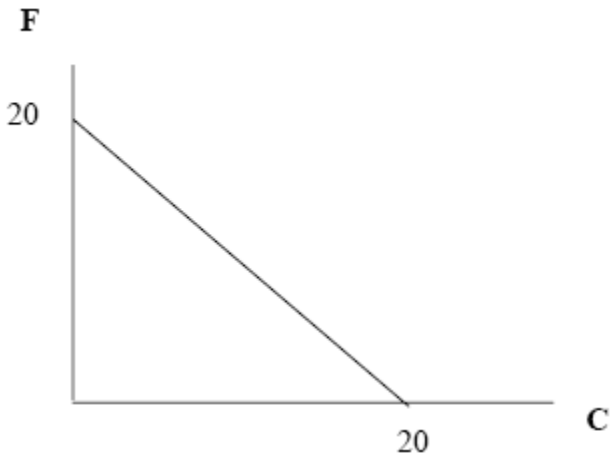
The curves are convex to the origin. This implies that Juan's willingness to trade food for clothing falls when the amount of food that he has declines relative to the amount of clothing. He is willing to give up a relatively large amount of food for a unit of clothing when he has lots of food and little clothing. This is not true when he has little food and numerous clothing.

c. Suppose Juan's budget is $100 and the prices of F and C are both $5. Graph the budget constraint.

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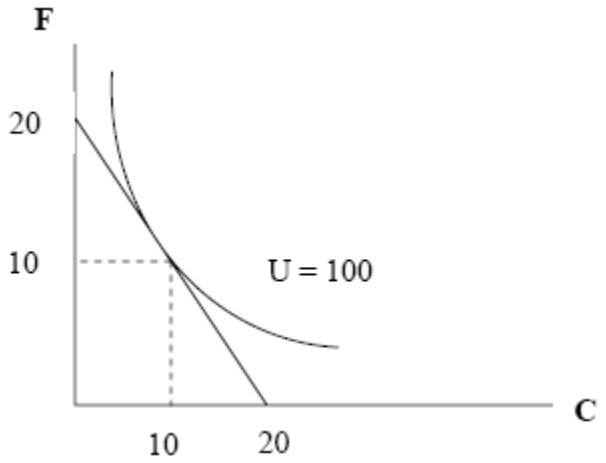
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Juan's budget constraint (I = \$100 and $P_C = P_F$ = \$5) is pictured as follows:



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?

Juan will purchase 10 units of food and 10 units of clothing. This provides Juan with 100 units of utility. Note that at current prices he can buy a total of 20 units of the two goods (in any combination). Any other combination produces lower utility. For example, 9 units of one good and 11 units of the other produces 99 units of utility. Graphically:

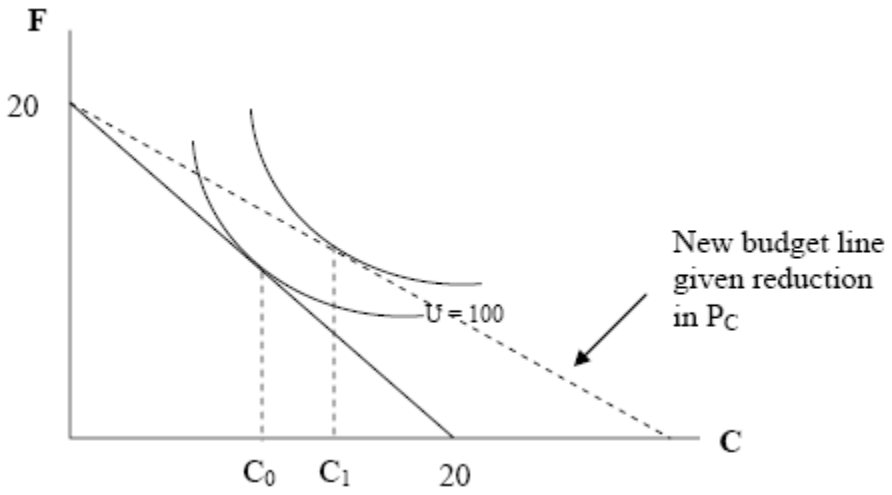


e. The Johnson Company is the sole producer of clothing. What can the company do to induce Juan to purchase more clothing? Show graphically. (The graph does not have to be exact.)

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It can lower the price of clothing. Graphically (does not have to be exact)



2-6. 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?

Straight line indifference curves indicate that Bob's willingness to trade one good for the other does not depend on the amount of each good he currently owns. This is the case of perfect substitutes. Consider the example of $5 bills and $10 bills. Your willingness to trade $5 bills for $10 bills is likely to remain at two for one, independent of how many bills of each kind you have. For example, if you have no $10 bills and a bunch of $5 bills you are still unlikely to trade more than two $5 bills to obtain a $10 bill. Another example is two brands of orange juice that you like equally as well.

2-7. 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?

Perfectly L-shaped indifference curves imply that Bob considers the two goods to be perfect complements. His utility does not increase if receives more of one of the goods without receiving more of the other good. One potential example is left and right shoes. Obtaining additional left shoes without obtaining matching right shoes is unlikely to increase a person's utility very much (assuming the person has two feet).

2–8. a. Briefly describe the five models of behavior presented in this chapter.

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Economic Model: People are creative maximizers of their own personal happiness (utility). Happiness can depend on many factors, including wealth, integrity, community respect, and so on.

Only-Money-Matters Model: All people care about is money. People act to maximize their monetary income. Same as economic model except that people care only about money.

Happy-is-Productive Model: Happy employees are more productive than unhappy employees.

Good-Citizen Model: Employees want to do a good job. Managers simply need to communicate the goals and objectives of the organization to the employees.

Product-of-the-Environment Model: The behaviors of individuals are largely determined by their upbringings.

b. What are the implications of these models for managers attempting to influence their employees' behavior?

The economic model suggests that managers should focus on incentives (monetary or otherwise) in trying to motivate behavior. The only-money-matters model suggests that managers should use only monetary incentives in trying to motivate behavior. The happy-is productive model suggests that productivity can be increased by enriching jobs and engaging in other activities to increase employee happiness. The good-citizen model suggests that managers should focus on communicating firm goals to employees. The product-of-the environment model suggests that managers should focus on hiring employees with a strong work ethic.

2–9. 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.

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The economic model suggests the employees in the two locations have different compensation or incentive schemes. Incentives to be productive appear to be higher at the Minnesota plant. Or, if the compensation plans are the same, the alternative employment opportunities differ so that individuals with different talents are attracted to the two plants. The only money-matters model is similar to the economic model in its explanation. However, the focus is exclusively on monetary incentives. The happy-is productive model suggests that employees are happier at the Minnesota plant. The good-citizen model suggests that employees at the southern California plant do not realize that it is important to the firm for them to work hard. The product-of-the-environment model suggests that the employees at the two plants are from different backgrounds. The employees at the Minnesota plant have a stronger work ethic.

2–10. 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?

The employees apparently are paid in a way that motivates this behavior. For instance, they might be paid a large sales commission on their personal sales. This commission plan might motivate employees to hide items on sale so that they can convince customers to buy higher-priced items. The commission scheme also might provide limited incentives to engage in nonselling activities, such as designing merchandise displays or helping coworkers. It is also likely that employees do not expect to work for the store for a long time period (turnover is high). Otherwise, they would have an incentive to build longer-term relationships with customers (to increase future sales commissions) and co-workers. The situation might be improved by changing the compensation scheme to increase the incentives to engage in nonselling activities and to consider the long-term implications of an action (such as creating customer expectations that the store will be out of items that are on sale).

2–11. 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?

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When a customer comes into a restaurant in the U.S. they have an implicit contract with the waiter to tip for good service. A customer might honor this contract for two reasons. First, the person might value being fair and not want to shirk on the implicit agreement (economics allows for people to care about fairness). Second, the customer will realize that if he shirks on the tip the next time he comes back to the restaurant the waiter will shirk on service. Tips are likely to be higher at restaurants in residential neighborhoods because the second effect (the repeat-customer effect) is likely to be large. Restaurants on interstate highways will be frequented by many customers who will not return. These customers have large incentives to shirk on the tip unless they care significantly about fairness to the waiter.

2–12. 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.

Compensation plans of this type provide incentives for teachers to emphasize the material covered in the texts. Yet such plans sometimes produce bad side effects. Teachers will have strong incentives to focus on test scores. This focus does not necessarily produce better teaching. In part, it depends on how well the tests measure learning. Moreover, some teachers are likely to discover ways to "game the compensation scheme." For instance, in some school districts, this type of compensation scheme has motivated teachers to teach the material to be tested rather than provide a more general education. In extreme cases, teachers get advanced copies of the exam and give the answers to students before the test.

2–13. 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.

According to the economic model simply raising pay by 20 percent is unlikely to increase productivity. The employees may be happier but not more productive. What is important is tying the pay raise to productivity. In this case, employees would be expected to exert more effort to increase the likelihood of the pay raise.

2–14. One physician who worked for a large health maintenance organization was quoted as saying:

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> *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.

The physician was obviously concerned about treatment expenses. Presumably, the HMO was paying the physician based on the total treatment costs for the patient. For example, the HMO might be paying the physician a fixed fee for treating each patient minus some function of any treatment costs (for example, payments to other specialists, and so on).

2–15. 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?

Risk-averse people are willing to pay a premium for insurance. They prefer a certain outcome to a less certain outcome and are willing to give up some expected value in order to reduce risk.

2–16. Critically evaluate the following statement: "Risk-averse people never take gambles."

Risk-averse people do take gambles. The expected return, however, has to be sufficiently high to offset the increased risk the person accepts. ***Note: There is frequently a difference between attitudes toward risk with respect to an individual's investment portfolio as opposed to placing a bet on a sports contest. We believe that this distinction can be used to motivate a discussion of the multifaceted nature of consumption. If placing a bet on the Super Bowl or world cup makes watching the game more interesting, then only part of the benefit of the bet comes from the expected cash payoff — the other part is the enhanced enjoyment of the game.***

2–17. 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?

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expected value = $2,000; standard deviation = $1,825

b. How much would a risk-neutral person be willing to pay for the investment?

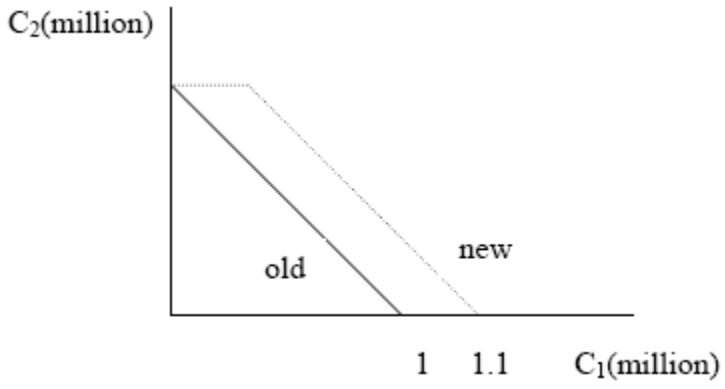
$2,000 (ignoring the time-value of money)

c. How much would a risk-averse person be willing to pay for the investment?

Something less than $2,000 (the exact amount depends on the level of risk aversion).

2–18. To spur consumer spending, suppose the Japanese government adopts an $85 billion voucher system whereby every Japanese consumer receives 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.

While in principle it could — it depends on the tangency points between the indifference curves and the budget lines — most likely consumption in the current period will not increase by the full 100,000. Rather, some will be saved for the future.

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c. How does the impact of this 100,000-yen voucher differ from simply giving the individual 100,000 yen?

It will have the same effect unless the average consumer wants to save more than 1,000,000 for the future (out of a 1,100,000 budget). The budget line with a pure cash supplement would be the same as pictured above except that it would fully extend to the y-axis. As long as the tangency point between the indifference curve and budget line occurs at a point where future consumption is below 1,000,000, there will be no difference. If the tangency occurs in the extended region, the consumer will save the maximum possible (1,000,000 and spend 100,000 in the current period – a corner solution).

2–19. People give to charity.

a. Is this action consistent with the "economic view of behavior"? Explain.

There is nothing in the Economic View that says that people can't gain utility from contributing to good causes. Also they may be doing this to create good will in the community. This might result in more business opportunities, less government red tape in completing transactions, etc.

b. Suppose that 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?

Economic analysis focuses on how changes in constraints (rather than preferences) effect behavior. One potential variable that might have changed is the tax code. For instance, deductions may have been eliminated making it more expensive to give to charity. The economic view would not typically make arguments like "people's preferences changed and thus they no longer felt like giving to charity."

c. How might the decline in giving be explained by the product-of-the environment model?

The product-of-the-environment model argues that people's behavior is explained by their upbringing and social background. Under this view, some people who were brought up to care about others give to charity, while others do not. Perhaps while per capita income has not changed, there has been a shift in income away from the giving group to the nongiving group, making giving less likely. Also, there may have been demographic changes due to relocations, deaths, etc.

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2-20. The Japanese are very good at returning lost property to local police stations. If you lose a wallet filled with cash in Japan it is likely to be turned into the police. This is true even though the person finding it could keep it without anyone else knowing. This behavior is not what you would find in New York City.

a. Does this observation about Japan imply that the economic model does not explain behavior in Japan? Explain.

The economic model of behavior asserts that individuals are interested in maximizing their own utility. In making decisions, individuals consider the incremental costs and benefits and make decisions only when the incremental benefits are larger than the costs. Decisions can change with changes in the incremental costs or benefits.

Turning in wallets full of cash is not inconsistent with the economic model. The marginal disutility from being dishonest might be larger than the benefits of the extra money given the typical Japanese utility function (given the typical amount of money found in the wallets). There is nothing in the economic model to say that people only care about money.

b. Police stations in Japan are filled with lost umbrellas. It used to be that the typical Japanese would make a trip to the local police station to search for a lost umbrella. Now they don't. Explain this behavior using the Economic Model.

The economic model predicts that people's behavior can change with changes in incremental costs or benefits. In the case of going to search for an umbrella there are a number of possibilities. First with increases in income of the typical Japanese worker, the opportunity cost of taking time to search for an umbrella has increased. This increase in marginal costs makes the choice less likely. Another possibility is that the price of replacing an umbrella has decreased so that the marginal benefit of finding an umbrella is smaller.

c. Do you think that the typical Japanese is more likely to come to a police station to find a lost cell phone or a lost umbrella? Explain using the Economic Model.

The marginal costs of going to the police station are likely to be the same in either case. However, the price and nonpecuniary costs of replacing a lost cell phone are likely to be higher than for an umbrella. Since the marginal benefits are more likely to exceed the marginal costs for retrieving cell phones, the economic model predicts that people are more likely to search for cell phones.

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2–21. 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:

a. Do you think criminals will commit more or fewer robberies in the states with the laws?

Based on the economic model, criminals are expected to consider the marginal costs and benefits of their actions in choosing the level and type of crime. Allowing citizens to carry handguns increases the marginal costs of robberies, since the criminals are more likely to get hurt or killed. Thus the economic model predicts that there will be fewer robberies in the states where handguns are allowed.

b. How do you think the laws will affect the *types of robberies* criminals commit? Be sure to explain your *economic reasoning*.

The laws affect the marginal costs of some types of crimes more than others. Crimes involving personal contact are the ones most likely to be affected by the laws. Therefore, the economic model suggests that criminals will substitute away from crimes involving personal contact to crimes of stealth in states where handguns are allowed.

Note: a study was conducted on this topic and both predictions were supported by the data.

2–22. 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."

People who pay $20,000 to join a golf club are likely to have a greater than average interest in playing golf. They may still consider only the marginal costs (e.g., time) and benefits in choosing how much to play. However, given their interest in golf (marginal benefits are high) they will tend to play frequently. Thus, the observation is more likely to reflect "self selection" than sunk costs.

2-23. 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.

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a. Is Jenny risk averse? Explain.

Yes, Jenny is risk averse. She is willing to take on more risk only if it is associated with a sufficiently higher expected return.

b. What is Jenny's "certainty equivalent" for her current investment? What does this mean?

The certainty equivalent is $10,000. She would be willing to accept a certain return of $10,000 (the vertical intercept of her indifference curve) in lieu of her current risky investment which has an expected return of $15,000 and a standard deviation of $5,000.

c. What is the risk premium on her current investment?

The risk premium on her current investment is $5,000. This is the difference in the expected return of her risky investment and the risk-free investment. The $5,000 risk premium is what it takes in expected return to make her indifferent between the risk and risk-free investments.

2-24. 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?

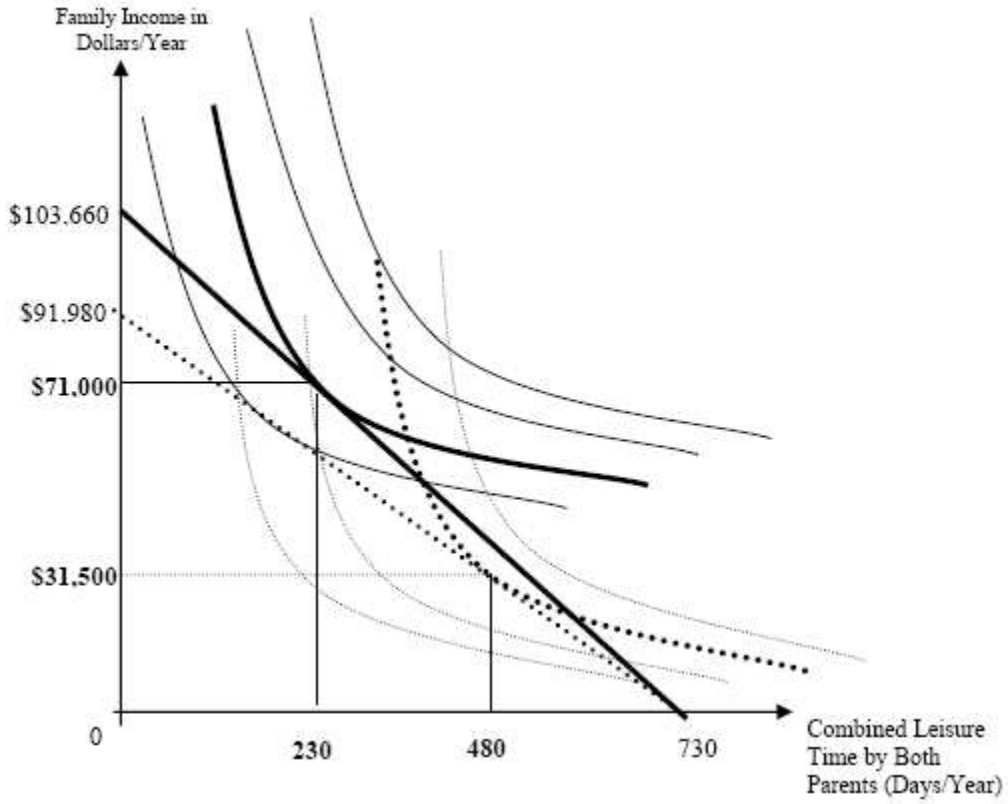
Andersen's statement is most consistent with the product-of-the environment model. According to this view, there was a "rogue partner" who was not raised with the same moral and ethical values as most of the other partners. In this case, Andersen's future problems would be solved by firing the bad apple and hiring a replacement with higher ethical values. The economic view of behavior would suggest that partners were acting in their own self interest given the costs and benefits that they faced. The capstone case at the end of Part 3 of the book provides a detailed study of Arthur Andersen. The evidence in this case suggests that the partners were motivated to be overly lenient on audits because of Andersen's performance evaluation system which encouraged them strongly to obtain additional business from their audit customers. One potential way to attract additional business from companies is to be easy on them in annual audits.

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2-25. According to a recent article in The Atlanta Journal-Constitution (January 29, 2004), "materialism, not necessity, gave birth to dual-income families." In supporting the argument, the author cites the following figures from the Department of Commerce: In 1970 the average wage per job was $6,900, which in 2001 dollars (adjusting for inflation) amounts to $31,500. In 2001, the average wage per job was $35,500. The main thesis of the article is that dual-income families are a result of a shift in consumer preferences toward consumption as opposed to leisure time/time spent with the family.

(a) Assume the average person worked 250 days during a year both in 1970 and 2001, and that, as reported in the article, only one person worked in the average family in 1970, while both parents did in 2001. Provide a graphical analysis of the typical family's choice between family income and combined parent leisure time that supports the author's argument, relying on the tools presented in class. Be careful in labeling your graph(s), and provide a clear and concise explanation for your graph(s). Note that there are 365 days in a year so that the total parent leisure time that is possible is 730 days (assuming neither spouse works). Assume it is possible for each family member to work anywhere from 0 to 365 days a year (at the going salary rate) if they choose to do so.



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In the figure above, the curves corresponding to the average 1970 family are given by the dashed lines, while the curves corresponding to the average 2001 family are given by the full lines.

In particular, if both parents worked 365 days per year (i.e. 0 days of leisure combined), the family would earn $91,980 in 1970, while in 2001 the same family would earn $103,660, given the figures in the article, and assuming average daily income did not vary with the number of days worked. If neither parent worked any day of the year, the combined number of leisure days is 730 and the total income is 0 in both years.

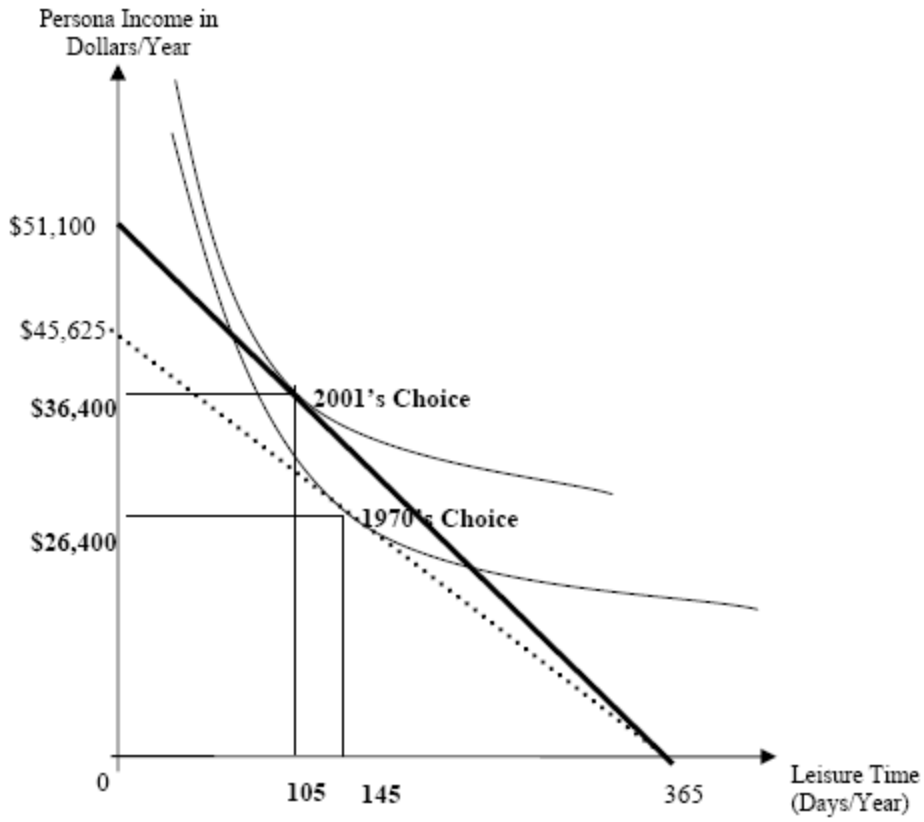
The two indifference maps (i.e. sets of indifference curves) drawn for the typical 1970 and 2001 family are consistent with the author's argument that families' preferences have changed over time. Indeed, since the indifference curves of the typical 1970 family cross those of the typical 2001 family, they could not be representing the same set of preferences, as this would violate one of the 3 basic assumptions underlying well-behaved preferences (*transitivity*).

It should be noted that although the author's argument is consistent with consumer optimization behavior, this does not mean that it is the only plausible explanation. In particular, as reported in the article, the average daily income has increased from 1970 to 2001 and, thus, the price of leisure has increased. Therefore, even holding preferences constant over time, it could be that families choose now to work more because the opportunity cost of not working has increased. See the next question for further details on this argument.

(b) Assume that in 1971 the average single person worked 220 days per year, while the same person worked 260 days per year in 2001. Moreover, suppose the average daily wage in 2001 dollars was $125 in 1970 and $140 in 2001. Show graphically how the author's argument would not necessarily apply to the average single person (i.e. assume preferences are unchanged). Explain clearly and concisely why the average worker may be choosing to work more in 2001 and carefully label your graph.

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As the figure above shows, it is very well possible that the same person (i.e. having identical preferences) chooses two different bundles of income and leisure time after a wage rate change.

In particular, an increase in the daily wage produces two distinct effects: first, the person is able to earn more after the increase, holding constant the number of leisure days he/she chooses to enjoy, or, similarly, the person could earn the same total income while enjoying more leisure time. However, at the same time, an increase in the daily wage rate increases the opportunity cost of leisure time.

Whether a person will choose to work more or less after the change depends on which of these two effects dominates, given the person's preferences. The indifference map in the graph above represents a set of preferences such that the second effect (increase in the relative price of leisure – substitution effect) dominates the first (the increase in income – income effect).

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The picture and explanation above complement the argument offered in the previous answer. That is, the higher number of dual-income families in recent year, which is documented in the article, is not necessarily the result of changing preferences. On the contrary, it could well be that, given the average family's preferences, higher wages cause families to choose to work more.

2-26 Russell and Joe have hired Maria to help cook in their restaurant. Maria had previously owned her own breakfast business. Her speed in cooking was well-known. Russell and Joe have been surprised that her productivity has fallen significantly since she became their paid employee. Use the economic view of behavior and marginal analysis to provide a potential explanation for Maria's reduced productivity.

A likely explanation is as follows: Maria is self-interested and finds working fast to be incrementally costly (it requires more effort). When she owned her own business, she realized additional profits by working faster which allowed her to serve more customers. Now she is an employee, who is likely to be paid primarily through fixed hourly wages. Basic marginal analysis implies that she will not exert as much effort as before. She still bears the same incremental costs if she works fast, but no longer receives the same incremental benefits as when she was an owner. [Note: this change in behavior is often observed when larger companies buy smaller companies and previous owners become employees – employees generally have lower incentives to work than owners)

2-27 Michael is a fan of the Rhinos – the local professional soccer team. At the beginning of the season, he purchased nonrefundable season tickets to their 10 home games for a total of $100. Michael places equal value on each of the home games. His value for any given game is independent of how many other games he attended during the year. Michael would be willing to stay at home, which he derives no benefit from, and miss an individual game, if he could sell the ticket for one game for $20 or more.

Michael has attended three out of the last five home games. The sixth home game of the season is tomorrow night. Michael's friend Fred has offered to sell him an extra ticket to a sold-out concert for $50 that happens to be on the same night as the game. Normally, Michael would be willing to pay $70 to attend the concert. There is no way that Michael can attend both the Rhinos' game and the concert. Looking online, Michael finds that he can sell his ticket for tomorrow night's Rhinos' game for $5.

a) What type/types of cost is the $100 that Michael paid for the season tickets? Explain why.

Sunk Cost. At the time Michael is deciding to attend the game or the

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concert, he has already purchased the season tickets. Therefore, what he paid for them is not relevant to his decision.

b) Which event will Michael decide to attend? Explain why.

Michael will decide to attend the concert. The incremental benefit he gets from attending the game is $20. The opportunity cost of attending is $25 (the $70-$50 = $20 for the forgone value of not seeing the concert, plus the $5 opportunity cost of not selling the Rhino's ticket). The net benefit of attending the game (incremental benefit – incremental cost) is -$5. Since this is negative, he should not attend the Rhinos game, but should go to the concert instead. The same decision is reached if he looks at it from the standpoint of attending the concert. The incremental benefit of attending the concert is $75 (the value of the concert, plus $5 from selling the Rhino's ticket), while the incremental cost is $70 ($50 for the ticket and $20 opportunity cost from not attending the game). The incremental benefit of attending the concert exceeds the incremental costs by $5. Since this is positive, he should attend the concert.

c) How much would Fred have to charge Michael for the concert ticket in order to make Michael not care which event he attended? Explain why.

Fred would have to charge $55 for the concert ticket in order to make Michael indifferent between attending the game and the concert. At this price, the net benefit of either option is zero. For example, from the viewpoint of going to the game: The incremental benefit is $20, while the opportunity cost is $20 ($70-$55 = $15 from the missed concert, plus $5 from not selling the ticket). Since the incremental benefit equals the incremental cost, he is indifferent between going to the game or the concert.

2-28 An entrepreneur quits his job as a banker and invests $100,000 of his savings in a new business venture that he will manage. Discuss the two most obvious opportunity costs that he will incur from this decision.

The two most obvious opportunity costs in this question are (1) the lost return that could be earned on investing the $100,000 of savings elsewhere and (2) the cost of the time that the person will use to manage the business (the value in its next best use).

2-29 You are trying to decide whether to fly or drive from Rochester to Boston during your summer visit. The trip is approximately 400 miles. You can purchase a

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round-trip nonstop flight for $230. The duration of each flight is 3.5 hours (seven hours in total). If you drive, it will take you approximately seven hours each way (14 hours in total). Your car gets 32 miles to the gallon and you expect gas will cost $3/gal. Tolls are $15 each way. You value your time at $15 per hour.

a.) Calculate the total cost of driving to Boston and back.

Monetary cost of driving:
400 miles / 32 mph = 12.5 gallons of gas needed
12.5 gallons of gas * $3 per gallon = $37.5 cost of gas one way
$37.5 cost of gas + $15 tolls = $52.5 cost of one way
$52.5 cost of one way * 2 = $105 total monetary cost of driving

Time cost of driving:
$15 time cost per hour * 7 hours driving * 2 = $210

Therefore, the total cost of driving is $315.

b.) Under these conditions, will you drive or fly?

First, we need to determine how much it costs to fly.
$15 time cost per hour * 3.5 hours to fly * 2 = $105
The total cost to fly is $105 (time cost) + $230 (airfare) = $335.
Therefore, under these conditions, we will drive. Driving is $20 cheaper.

c.) What if you value your time at $20, rather than $15, per hour?

If you value your time at $20, rather than $15 per hour, the time cost from par a.) and b.) will be changed:
$20 time cost per hour * 7 hours driving * 2 = 280 So, the total cost of driving is $105 + $280 = $385.

The total cost in time to fly is:
$20 time cost per hour * 3.5 hours * 2 = $140
So, the total cost of flying is $140 + $230 (airfare) = $370

At $20 per hour flying is the least costly option.

d.) You are offered a deal for $180 total airfare if you take a flight with a one hour layover in NYC (total flying time does not change). Do you take the deal? Will this change your flying versus driving decision? (Use the $15 per hour value of time in the calculation.)

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With an additional hour of flying due to the layover, the total cost of flying becomes $300, $180 for the round trip ticket and $120 for 8 hours of time at $15/hour, so flying would be the cheaper option.

e.) What are some other costs you may want to consider in this analysis?

Flying has additional restrictions, such as baggage fees and parking fees, that might need to be considered. If you were planning to take multiple bags on the aircraft, that could be quite costly. In addition, the security measures at the airport require additional inconveniences that might be costly, such as limiting the size of certain toiletry items in carry-on baggage so checking a bag might be required.

f.) If you were expecting a snow storm, how might this change your analysis? What are some other costs you may want to take into consideration?

Inclement weather might cause additional delays, both driving and flying, so you would need to weigh the length of any expected delays. Driving might cause additional delays due to unforeseeable accidents. Flights might be entirely canceled due to a snow storm. Airlines are not required to compensate you for delays due to weather, which might result in additional expenditures.

2-30 The school is having a happy hour on Friday. If you go, you will get two free drink tickets and snacks, for which you would normally pay $15. However, you will have to pay $10 for the cab fare home. You also have a free student ticket to the local profession team's soccer game. There is no resale value, as free tickets are still available.

a.) What is the opportunity cost of going to the soccer game?

The opportunity cost of attending the soccer game is attending the happy hour on Friday, which has a net benefit of $5 (the $15 benefit minus the $10 cost of the cab ride).

b.) If you would not normally pay to go to the soccer game, which will you choose?

The net benefit of attending the soccer game is $0, since you did not pay for the ticket and it has no resale value. The net benefit of the happy hour is higher so you would choose to attend it.

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APPENDIX PROBLEMS

1. Define the following terms: marginal utility, ordinal utility, marginal rate of substitution, equal marginal principle, demand function, substitution effect, income effect, normal good, inferior good, perfect complement, and perfect substitute.

Marginal utility measures the additional utility that is obtained by consuming one additional unit of a good, while holding all other goods constant.

Ordinal utility yields the ranking of consumption bundles. Absolute comparisons based on the levels of utility can't be made.

Marginal Rate of Substitution (MRS) is the absolute value of the slope of an indifference curve.

Equal marginal principle (as used in this appendix) is the condition that the marginal utility per dollar is the same for all goods at the optimum.

Demand function expresses the mathematical relation between the quantity demanded for a product (how many units consumers will purchase) and the factors that determine consumer choice (such as prices and income).

Substitution effect is the change in the quantity demanded of a good when its price changes, holding the prices of other goods and utility constant.

Income effect is the change in the quantity demanded of a good because of a change in income, holding prices constant.

Normal good is a good whose demand increases (decreases) with increases (decreases) in income.

Inferior good is a good whose demand decreases (increases) with increases (decreases) in income.

Perfect complements have indifference curves shaped as right angles. In this case, the two goods are used in fixed proportions.

Perfect substitutes have indifference curves that are shaped as straight lines. In this case the consumer purchases only one of the two goods (unless the slopes of the budget line and indifference curve are the same).

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2. Susan Pettit's preferences for coffee (by the pound) and doughnuts (by the dozen), can be characterized as follows:

$$MU_{coffee} = MU_x = y^2$$

$$MU_{doughnuts} = MU_y = 2xy$$

a. If the ratio of relative prices is $(P_x/P_y) = 6/3 = 2$, and Susan's income is \$90 per period, what combination of pounds of coffee and dozens of doughnuts will she choose?

At Susan's optimum:

$y^2/2xy = 2$

$y = 4x$ (1)

Given Susan's income:

$6x + 3(4x) = 90$ Coffee: X = 5 Doughnuts: Y = 20 (from equation 1)

b. Now let the ratio of coffee to doughnut prices decline to unity (=1), holding the price of doughnuts constant. How does Susan respond to the reduction in the relative price of coffee?

$y^2/2xy = 1$ $y = 2x$

$3x + 3(2x) = 90$ Coffee: X = 10 Doughnuts: Y = 20

Thus, the decline in the price of coffee motivates Susan to increase her consumption of coffee to 10 units (she continues to consume 20 doughnuts)

c. Redo parts (a) and (b) for the case of income of \$60 per period

Redoing part a:

$6x + 3(4x) = 60$ Coffee: X = 3.33 Doughnuts: 13.32 units

Redoing part b:

$3x + 3(2x) = 60$ Coffee: X = 6.66 Doughnuts: Y = 13.32 units

d. Derive Susan's demand function for coffee.

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$y/2x = p_x/p_y$ $y = (2x)p_x$ (1)

From the budget line: $x = (I-p_y y)/p_x$ (2)

Substituting equation (2) into equation (1)and solving for y:

$Y = 2/3\ (I/p_y)$

e. Is coffee a normal or inferior good for this consumer?

Coffee is a normal good for Susan since its consumption increases with income.

f. Does Susan consider coffee and doughnuts to be either perfect complements or perfect substitutes? Explain.

No they are neither perfect substitutes are complements. Susan does not consume the two goods in fixed proportions (so they are not complements). She also does consume only one good as relative prices change (so they are not perfect substitutes). The marginal rate of substitution (y/2x) continuously declines as Susan consumes more x and less y along an indifference curve.

3. Susan's demand function for coffee in the previous problem includes only the price of coffee and income. Thus changes in the price of doughnuts do not affect the demand for coffee. Does this imply that there is no *substitution effect* between the two goods? Explain.

No. The fact that the price of coffee is not in Susan's demand curve for doughnuts does not imply that there is no substitution effect between the two products. With convex indifference curves there is always a positive substitution effect. The demand curve reflects both the income and substitution effects. Increasing (decreasing) the price of coffee motivates Susan to substitute toward (away from) doughnuts. However, this change in her demand for doughnuts is exactly offset by the income effect from the change in her effective income as the price of coffee changes.

4. (More challenging problem) Mario Casali is a TV newscaster who gets an annual clothing allowance to buy suits that he must wear during his televised forecasts. He allocates the allowance each year between expensive Italian suits and cheap American suits. Mario's utility function for suits is $SA^{5.}$ where S is the number of Italian suits bought and A is the number of American suits bought. Last year, Mario bought two Italian suits and four American suits. [Note: $MU_S = A^{5.}$ and $MU_A = .5SA^{(-5)}$]

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a. If Mario was maximizing his utility last year, what was the ratio of the price of an Italian suit to the price of an American suit (P_S/P_A)?

At Mario's optimal choice:

$MU_S/MU_A = P_S/P_A$

$A^{.5}/.5A^{(-.5)}S = P_S/P_A$

$A/.5S = P_S/P_A$

$4/.5(2) = 4 = P_S/P_A$

b. What was Mario's clothing allowance last year if the price of an Italian suit was $1,000?

P_S = $1000 implies that P_A = $250 (from part a)

$$\textbf{Clothing allowance} = \$1000 \times 2 + \$250 \times 4 = \$3000$$

c. If Mario has the same allowance this year as last year, and American suit prices have not changed, how high would the price of Italian suits have to rise in order for Mario to want to buy exactly one Italian suit this year?

As given in the problem, let S = 1

From the budget line:

$$\$250 \times A + P_S \times 1 = \$3,000$$

$$A = 12 - (P_S/250)$$

From the optimal condition stated in part a: $(12 - \frac{(P_S/250)}{.5} = P_S/250$

$$P_S = \$2000$$

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(Alternatively, the optimal condition in part a implies that $P_A A = .5SP_S$; this implies that Mario will always spend 1/3rd of his budget on A and 2/3rd of his budget on S; thus P = $2000 when the S = 1 and the clothing allowance is $3,000.)

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