

*Solutions Manual for Principles of
Microeconomics v5 1st Edition by
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Solutions for Chapter 1, Economics: The Study of Choice

Concept Problems

1. By definition scarcity is the condition of having to choose among alternatives. A scarce good is one for which the choice of one alternative requires that another be given up. Scarcity is the result of having limited resources and relatively unlimited wants.

2. No. The relative abundance of a good or service is determined in relation to the wants of people. For any good or service for which the choice of one alternative requires that another be given up, scarcity exists. Sand, for example, is relatively abundant, but the fact that choosing one use of sand (e.g., for making concrete) requires that another use (e.g., leaving it on the beach) be forgone, which means that sand is scarce.

3. No. Scarcity is not determined by who makes choices among alternative uses. The fact that someone must choose among them implies scarcity.

4. The opportunity cost of a choice is the value of the best alternative forgone in making any choice.

5. The dollar cost of taking an economics course will, of course, vary by institution. Whatever the dollar cost, however, it does not fully reflect the opportunity cost of taking the course. The opportunity cost includes the dollar cost (as a measure of the value of the best alternative goods and services forgone), but it also includes the value forgone of the best alternative use of your time. For example, the opportunity cost for some students' time might be the income forgone by choosing school over work (or, for other students, the value of leisure forgone).

- 6. a. Microeconomics
- b. Microeconomics
- c. Macroeconomics
- d. Macroeconomics
- e. Microeconomics

- 7. a. How; positive
- b. For whom; normative
- c. What; positive
- d. How; positive
- e. How; positive
- f. How; normative
- g. For whom; normative

8. They came so close because economic theory describes the best, optimal prescription, and these professional soccer players had a strong financial incentive to find and follow that prescription. Youths playing soccer do want to win, but don't have nearly as much

riding on the outcome, so may not try as hard to find that ideal mixture of kicking and defending left and right.

9. They likely found that through a lot of trial, error, and experience: “When I kick to the left a little bit more often, my success rate rises,” or “When I defend right a little less, my success rate rises.” That trial and error (a bit more left; a bit more right, etc.) is the essence of marginal decision making in the real world.

10. A younger student has a longer career over which to apply their education. Younger students are also likely to have lower opportunity costs because their earning prospects are lower.

11. When customers are charged a flat fee, the cost of water use at the margin is zero. When water is metered, the marginal cost of each additional unit of water is given by the fee that is charged. Economists expect that people would tend to use more water per person when a flat fee (i.e., zero marginal cost) is used and that they would tend to conserve on the use of water when charged for each additional unit.

12. a. The proposition that a reduction in the availability of heroin (perhaps due to increased law enforcement efforts) will increase total spending on heroin and increase the crime rate could be tested using surveys of users and crime statistics. If, at the same time, there were a change in the level of economic activity in the economy (e.g., a loss of jobs due to the closing of a large employer in the region), the “all other things unchanged” condition would be violated and special consideration would have to be given to that situation. A change in the crime rate or a change in the amount spent on heroin might follow a change in its availability, but it could be that the cause and effect are the other way around. If the crime rate increases, and with it the degree of law enforcement also increases, that may make heroin suppliers less willing to make it available in a particular community.

b. The proposition that higher income makes people happier could be tested by looking at statistics on the relationship between, say, suicide rates and income or between divorce rates and income. To avoid the “all other things unchanged” problem, the researcher would want to devise the test in such a way as to identify other factors that might be involved, such as age, education, marital status, job satisfaction, region of the country, season of the year, etc. The fallacy of false cause might be that happier people are more productive workers and, therefore, more likely to earn higher incomes.

c. Statistics on community populations and their characteristics could be used to test the proposition that higher incomes make people live longer (perhaps because of access to health care or because of better nutrition). There are many other considerations that would have to be accounted for to avoid the “all other things unchanged” problem, including race and ethnicity, pollution levels in the community, smoking habits of individuals in the study, etc. The fallacy of false cause is involved because it may be the

case that people who are healthy are also more likely to have jobs that pay higher incomes.

13. The assumption of a perfect vacuum simplifies the analysis. The test of such models is whether they yield useful predictions; experience has shown that they do.

14. You would certainly want to collect data on grades in situations with and without the publication of teacher evaluations. You would also want to evaluate grading practices of teachers who have not yet achieved the status of tenure and compare them to those who have (and, perhaps, are therefore less apt to be influenced in their grading practices than other, less experienced teachers). Observing the same students and teachers in the same classes and at the same point in their respective “careers” under controlled conditions would probably not be possible; any such test would require having a sufficiently large population to avoid making judgments based on a small sample.

15. Presumably, being bald doesn't cause heart disease. There may be a third factor that is responsible for both balding and heart disease. One possible factor that researchers are considering is high levels of testosterone in some men.

16. Regulators faced a tradeoff between the lives that would be lost to COVID without the drug and lives that might be lost due to blood clots were the drug's use continued. Ultimately, most regulators in Europe believed the greater number of lives would be saved by authorizing the vaccine's use.

17. There is no right answer to what the governments *should* have done—that is a normative question.

a. States that provided to the elderly first operated under the belief that it was better to let the virus spread among the young, who were much less severely impacted by it, and then protect those most likely to be gravely hurt by it, the elderly.

b. States that provided vaccines early on to the youngest people operated under the belief that it was best to control the spread and then deal with a reduced number of cases among the elderly.

18. It is unlikely that people drown because they eat ice cream. Instead, a third factor—hot weather—is likely causing people to eat more ice cream and go swimming more often (resulting in more drownings).

19.a. The trade-off is potentially a lower lifetime salary coming but two additional years of earnings, and two years in which college tuition, etc. need not be paid.

b. Data on the typical lifetime earning profile for college graduates (including starting salary and potential increases) and the typical lifetime earning profile for someone in the trades.

c. You might consider the likelihood of success in both trade school and college, the cost and expense of college, the cost and expense of trade school, and the career field chosen (for both college and trade school attendees).

20. Because there are economies in which having a second child doesn't double the cost of raising kids. This is because kids can share resources: the second child can potentially use the first kid's hand-me-downs; if the two kids are close together and a parent stays home to watch the kids, the foregone earnings are lost only once, not twice. The kids can share vacations, meals, trips to school, etc.—all things that would happen with one child that can happen for two kids at almost the same cost.

21. No matter how much we have, there is always the desire for more. Since desire is part of the nature of scarcity, it means that scarcity will always exist.

22. Panem is using a scheme to allocate food and shelter that relies on a lottery (who will be chosen to compete) plus a tournament (to the winner goes the spoils). Non-participants are allocated basically whatever it is the government wants to give them (command).

23. Jimmy convinces Neff that in the time they spend waiting for a better candidate, Jimmy will be selling copiers and earning income for the firm. Jimmy convinces them that that income will eclipse the additional earnings that a better salesman (hired later) would generate.

24. Ferris knows that time is a scarce resource and believes that spending that time experiencing life will bring greater benefit than spending that time in school. That's optimization. His marginal analysis appears here (marginal benefit of an hour away > marginal cost (missing school)) and also appears in his analysis of illness: He has to make the ninth sick day count because it is getting more difficult (costly) to come up with believable illnesses. This is an example of the law of increasing marginal cost (in Chapter 2).

25. Farva has already filled his tank by pumping 9.19 gallons. He sees the sign: If he pumps another 0.81 gallons, he can get a "free" hot dog (marginal benefit). That additional 0.81 gallons, at \$1.76 per gallon, implies a marginal cost of \$1.43. If hot dogs cost more than \$1.43 to purchase, his decision is a good one—Farva is a good economist: Better to earn a hot dog by spending \$1.43 on gas rather than, say, \$2 on the hot dog directly. If, on the other hand, hot dogs cost less than \$1.43 to purchase, Farva is spending more on the gas to get a hot dog than the hot dog actually costs—Farva is a poor economist.

26. Say that a worker will be on an assembly line for eight hours. If time and motion studies minimize wasted movements, then the assembly line can run a bit faster, and more items can be produced in that same eight hours. That squeezes the greatest value out of the scarce resource (labor time).

27.a. Event A does not cause Event B, nor does Event B cause Event A.

- b. There is no third Event C that causes both Event A and Event B.
- c. This is simply a coincidence. But Joey blames Rachel, falling for the Fallacy of False Cause.

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Chapter 1

Economics: The Study of Choice

Overview

Choices are forced on us by scarcity; economists study the choices that people make. Scarce goods are those for which the choice of one alternative requires giving up another. The opportunity cost of any choice is the value of the best alternative forgone in making that choice.

Some key choices assessed by economists include what to produce, how to produce it, and for whom it should be produced. Economics is distinguished from other academic disciplines that also study choices by an emphasis on the central importance of opportunity costs in evaluating choices, the assumption of maximizing behavior that serves the interests of individual decision makers, and a focus on evaluating choices at the margin.

Economic analyses may be aimed at explaining individual choice or choices in an individual market; such investigations are largely the focus of microeconomics. The analysis of the impact of those individual choices on such aggregates as total output, the level of employment, and the price level is the concern of macroeconomics.

Working within the framework of the scientific method, economists formulate hypotheses and then test them. These tests can only refute a hypothesis; hypotheses in science cannot be proved. A hypothesis that has been widely tested often comes to be regarded as a theory; one that has won virtually universal acceptance is a law. Because of the complexity of the real world, economists rely on models that rest on a series of simplifying assumptions. The models are used to generate hypotheses about the economy that can be tested using real-world data.

Statements of fact and hypotheses are positive statements. Normative statements, unlike positive statements, cannot be tested and provide a source for potential disagreement.

Chapter Outline

Section 1.1 Start Up: Economics in the News

- Economics is everywhere:
 - Job market, economic growth, national debt
 - Obesity, education, crime
 - Weather, traffic, even wine
- Economists study the choices people make and those choices' implications.

Section 1.2 Defining Economics

- Learning Objectives
 - Define economics.

- Define the concepts of scarcity and opportunity cost and explain how they relate to the definition of economics.
 - Explore the three fundamental economic questions: What should be produced? How should goods and services be produced? For whom should goods and services be produced?
- Scarcity, Choice, and Cost
 - Scarcity is the condition of having to choose among alternatives.
 - A scarce good is a good for which the choice of one alternative requires that another be given up.
 - A free good is a good for which the choice of one use does not require that another be given up.
 - e.g. when you use gravity it does not prevent your neighbor from using gravity.
- Scarcity and the Fundamental Economic Questions
 - An economy is an organization that produces goods and services and then allocates them to people for use.
 - Any economy must answer three questions:
 - What should be produced?
 - How should goods and services be produced?
 - For whom should goods and services be produced?
- Case in Point 1.2: The Opportunity Cost of COVID-19
 - Early in the coronavirus crisis, countries faced a trade-off between containment and economic freedom.
 - Shutting down and restricting behavior helped contain the virus but came at great economic cost.
 - Countries with fewer restrictions and earlier reopenings suffered greater casualties. That came with its own costs.

Section 1.3 The Field of Economics

- Learning Objectives
 - Identify the distinguishing characteristics of the economic way of thinking.
 - Distinguish between microeconomics and macroeconomics.
- The Economic Way of Thinking
 - Distinguishing features between the economic and the social science approach to choice:
 - Economists give special emphasis to the role of opportunity costs in their analysis of choices.
 - Economists assume that individuals optimize, making choices to maximize the value of some desirable objective.
 - Economists argue that individuals pay attention to the consequences of small changes in the levels of the activities they pursue.
 - Economists argue that an understanding of opportunity cost is crucial to the examination of choices.
 - Benefit of the economic way of thinking:

- It pushes us to think about the value of alternatives in each problem involving choice.
- A choice at the margin is a decision to do a little more or a little less of something.
- The margin is the current level of an activity.
- Making choices at the margin helps individuals optimize.
- The elements of opportunity cost, optimization, and choices at the margin can be found in each of two broad areas of economic analysis:
 - Microeconomics
 - Macroeconomics
- Microeconomics and Macroeconomics
 - Microeconomics is the branch of economics that focuses on the choices made by consumers and firms and the impacts those choices have on individual markets.
 - Macroeconomics is the branch of economics that focuses on the impact of choices on the total, or aggregate, level of economic activity.
- Putting Economics to Work
 - Economics majors have a wide range of employment opportunities.
 - Careers
 - Economists work in government, for businesses, and in colleges and universities.
- Applying Economics to Other Fields
 - Undergraduate work in economics serves as excellent preparation for law school.
 - Average salary offers for economics majors are among the highest across the disciplines.
- Case in Point 1.3: Economics Scores Big in Professional Soccer
 - Economics is everywhere—even on the soccer field.
 - Economists use theory to determine the way someone who optimizes should play the game.
 - Professional players end up playing as much as the economists predict they should.

Section 1.4: The Economist's Tool Kit

- Learning Objectives
 - Explain how economists test hypotheses, develop economic theories, and use models in their analyses.
 - Explain how the all-other-things unchanged (*ceteris paribus*) problem and the fallacy of false cause affect the testing of economic hypotheses and how economists try to overcome these problems.
 - Distinguish between normative and positive statements.
- The Economists' Tool Kit
 - A variable is something whose value can change.
 - A constant is something whose value does not change.
 - The scientific method is a systematic set of procedures through which knowledge is created.

- A hypothesis is an assertion of a relationship between two or more variables that could be proven to be false.
- A theory is a hypothesis that has not been rejected after widespread testing and that wins general acceptance.
- A law is a theory that has been subjected to even more testing and that has won virtually universal acceptance.
- Models in Economics
 - A model is a set of simplifying assumptions about some aspect of the real world.
 - They help us understand the economy and help us generate hypotheses about the economy.
- Testing Hypotheses in Economics
 - Hypotheses in economics specify a relationship in which a change in one variable causes another to change.
 - A dependent variable is a variable that responds to a change
 - An independent variable is a variable that induces a change.
 - When forming a hypothesis, economists assume other factors are held constant. Ceteris paribus is a Latin phrase that means “all things unchanged.”
 - Reaching the incorrect conclusion that one event causes another because the two events tend to occur together is called the fallacy of false cause.
 - A positive statement is a statement of fact or a hypothesis. Positive statements are testable.
 - A normative statement is a statement that makes a value judgment
- Case in Point 1.4: Does Baldness Cause Heart Disease?
 - Bald men are more likely to have heart attacks.
 - Will taking drugs to prevent hair loss reduce the risk of heart attack?
 - What is the direction of causation?

Additional Materials

Common Student Difficulties

1. Students are accustomed to skimming the introductory chapters of a text (and instructors often do the same thing in their lectures). The material in Chapter 1 and its Appendix (at the end of the text), however, is fundamental to everything that follows. Skimming is likely to lead to confusion. For many, perhaps a majority, economics will be an alien subject, one that they have not encountered except accidentally in high school social studies or history courses. Many students will be enrolled because it is required for their major or because they had no other option for a particular distribution requirement in general education at the time they registered. As a result, many students in the class may have negative attitudes about the subject. It is important to overcome these negative preconceptions as much as possible and as soon as possible. For this reason, the material in this chapter should be developed carefully. Do not skim over it by listing the definitions quickly and going on to the more interesting (to the instructor) topics in successive chapters. The chapter intuitively develops such basic concepts as marginal cost and benefit and opportunity cost. It takes time for students who know nothing

about the subject to assimilate the material. Allow that time. Make one or more assignments that everyone should be able to complete successfully. Nothing breeds success like success. Let them succeed early on.

2. The math-phobic students will “tune out” or freeze when the material in the Appendix is presented and may be equally concerned about the section on Economics as a Science. Again, take time by working examples on the board or overhead and by giving them plenty of samples to work on their own. Encourage them to use the Try It! exercises. Certainly, group work in class is the least intimidating. Only a small number of peers know about mistakes and they can learn from peers who are less math-phobic. Repetition is critical. Begin a subsequent class meeting with a numeric example related to the class period from the previous meeting. Let the students try to interpret the graph or work the problem on their own or in groups before explaining the example. Students learn by doing even if in very short but repetitive exercises. If the examples they work come from the “real world” so much the better. That will help to show the relevance of the subject. Do not hesitate to continue presenting example problems from class periods several days earlier. Homework problems or quizzes on the same subject matter can supplement such examples.

Suggestions for Active Learning

Micro Essays

1. Why is the opportunity cost of a particular choice the value of the next best alternative rather than the sum of the values of all the alternative choices given up?
2. Identify a choice you made yesterday. List at least four alternatives you had. Which was the next best choice available to you? Would others have placed your second choice second on their lists? Why or why not?
3. The text example in the Appendix of movements in the stock market and the average temperature in San Juan shows that relationships between variables exhibited by sample data may be meaningless. Describe one way we can guard against accepting such relationships as real.
4. How are facts and hypotheses related to each other, if at all?
5. Why does a change in a variable assumed constant cause a line graph to shift?

Group Activities

Discussion of Micro Essays: The group discussion of micro essays described in the preface is a good way to introduce group work in a class. It should take less than 15 minutes total. Another way to use one or more of the micro essay topics is to give them as group quizzes. Follow all the procedures for a quiz. Hand out or write the quiz on the board or overhead and give a specified time to complete the answer. Have three to five students answer the question with only one response. You can either collect the group answers for later evaluation or ask for oral presentations and discussion in class.

Interpreting Data: One way to introduce the interpretation of data is to have groups transfer the same data onto pre-made grids of different scales. The third Try It! exercise in the Appendix is an example. Pose the same question to all the groups. For instance, in the text example about tax changes and income, the question could be, “Do increases in the federal tax rates increase federal revenues?” Ask each group to answer the question after completing the graph. Have the groups report their answers orally. Then display all the graphs of those whose answers agree next to each other. If this is done before the Appendix is read completely, the significance of scale will be clearly demonstrated in a memorable way. The group graphing will also help those who lack mathematical sophistication to see the point as well as the more mathematically oriented students. If asked to complete the graphing individually as a homework assignment, the math-phobic students will struggle with the graph and lose the point of making it.

Demonstrating Correlation (or Lack of It): A similar exercise can be completed showing correlation or lack of it by providing every group with the same time series already graphed and time-series data for another unnamed variable which they are to graph on the same sheet. Each group should have a different second variable unless the class is so large that preparation is inordinately difficult. If there are a large number of groups, try to have the same number of duplicate groups for each second variable. Ask each group whether the two variables are related. It is best if the groups display their completed graphs to the class. Let students agree or disagree with the conclusions of the groups about the relatedness of their variables. Then identify the mystery variables for each group. Have them reconsider the relatedness or lack of it. Whatever they conclude about relatedness, ask them to generate hypotheses which would explain their conclusion. Again, have them report their conclusions and their best explanatory hypothesis to the class. This exercise can be completed over two class periods. Complete the first part in class, assign the second part to be done as an out-of-class assignment, and hold the reporting of the second part in a subsequent class meeting.

In-Class Activities

One simple class activity that can illustrate correlation versus causation is to have students stand on opposite sides of the room based on whether their first names end in a consonant or a vowel (counting “y” as a vowel). You can predict in advance that the average height of those with names ending in consonants will be greater than the other group. Once the students are grouped, they can give their heights to a recorder who enters them into a calculator and determines the average. If the class is large enough and the enrollment is fairly random, the consonant group will have greater average height. Does calling children names with a consonant ending cause those children to grow tall? Have them brainstorm other hypotheses consistent with the outcome.

Eventually, someone will probably notice that the consonant group has more male students than female students, whereas the vowel group has more female students than male. In some instances, both groups may be dominated by the same gender, but the relative weighting of males will still be higher in the consonant group. In fact, there is a larger share of common male first names in the United States that end in consonants than the share of female names that end in consonants. The difference in height of the two groups is really associated with the larger

proportion of males in the consonant group and the fact that in general males are taller than females. Warning: If the class enrolls primarily one gender with only few of the other, or if it enrolls a large proportion of foreign students, the association between “maleness” and ending consonants is likely to be broken. Further, if the class is small, there is a greater likelihood of exceptionality and the failure of the correlation to hold. On the other hand, if the class is small it would be relatively easy to check the class roster to determine whether the experiment would work. Classes of 40 or more should be large enough.

Websites

<http://ecedweb.unomaha.edu/home.cfm>

The economic Education Web provides economic resources for university and college teachers. The site provides many links to economic data and teaching ideas for both traditional and cyber classrooms.

<http://www.nabe.com>

The National Association for Business Economists is a membership organization for economists. Much of its website is available to the public, including a summary of the biennial salary survey. The Careers page has a good summary of the types of jobs open to economics graduates.

<http://www.councilforeconed.org>

This is a link to the Web site of the Council for Economic Education. The site contains reference materials, instructions on using the internet for teaching, and links to state council Web sites in most states. State councils and Centers for Economic Education at various universities are listed here with addresses, phone numbers, and web addresses, if applicable. The National Council publishes numerous materials on various topics in economics suitable for high school students. These materials are especially appropriate for the introductory part of a college level principles course, since so many students have never studied economics before.

<http://www.econedlink.org/>

The National Council Web site links to another Economics America site that contains material useful to both faculty and students. Econ Ed Link offers an analysis of a news event of the week using economic theory and several short pieces on applying economic theory to contemporary issues. Since these change regularly, the site is especially good for finding current examples to add to lectures. These materials can also be used as Internet assignments. Have students read one of the topics or the week's news analysis. Different kinds of assignments can then be made. Ask students to identify economic concepts being used, respond to a question specific to the reading, or to critique the analysis.

Lecture Extensions

The Concept of Maximization

Economists have stressed the maximizing behavior of humans: the careful calculation of gains and losses from taking an action or its alternative. Historically, this calculation was nearly

always expressed in money terms, although occasionally non-monetary implications were mentioned but then ignored. Sometimes this kind of activity has been considered the essence of rationality and gives the impression of humans who are selfish, always thinking with their adding machines or computers but never allowing emotion to enter into consideration. The fictional maximizer has been called homo economicus (economic man). This picture of a grasping, money-grubbing human calculator has been much maligned in critiques of economics. The homo-economicus just described, though, is only a caricature of the real maximizing behavior modern economists mean when they speak of maximization. Unfortunately, economists themselves often contribute to the caricature by oversimplifying the meaning of maximization. The modern maximizer is much more complex than the caricature and possesses a much richer set of values and behaviors.

Richard B. McKenzie and Gordon Tullock provide an excellent source for this broader explanation in *The New World of Economics*. (McKenzie, Richard B., and Gordon Tullock, *The New World of Economics* 6th ed. New York: McGraw-Hill, Inc., College Custom Series, 1996.) McKenzie and Tullock argue that people act purposefully to improve their lot. Thus, people with many different life-styles can be and are acting rationally. It is just as rational for Mother Teresa to choose a life of relative poverty given her values, as for President Donald Trump to choose a life of extreme accumulation given his. It is important to emphasize that the maximizing behavior thus described is just that: an attempt to describe how people actually behave in a whole range of circumstances, many of which involve no money at all. It is a positive statement rather than a normative one.

The Concept of Rationality

The concept of rationality adopted by economists differs from that of many other social scientists. In fact, many others argue that people behave irrationally much of the time and that the environment determines what people do. Economists, on the other hand, believe that people do what they can to overcome the obstacles the environment places between them and their goals. Their ability to do this will be limited by how great the obstacles are and how intense their desire to achieve the goal is. Far more will be done to achieve a goal held with great intensity than for a goal that is merely desirable. The environment certainly influences the outcome, but for economic theory it does not determine the outcome. Given such a concept of maximizing behavior, the economic way of thinking can be applied to many topics seemingly unrelated to money. Economists explore such diverse topics as the choice of a spouse, the rationality of drug usage, sexual behavior, and voting patterns. Behavioral economics challenges this idea. The text introduces some of the ideas of behavioral economics in the chapter on Public Finance and Public Choice.

Experiments for Economics

The text notes that economists usually do not have the luxury of a controlled laboratory experiment since the world is their laboratory. Some economists, however, have designed laboratory experiments, often using laboratory animals and sometimes using human subjects. The animal experiments have demonstrated that even animals respond to incentives and make choices based on their perceptions of “costs” and “benefits.” Experiments using students are often used to illustrate economic principles in classes. Students are presented with a situation

and given possible actions. Their spontaneous choices usually culminate in the outcome which economic theory predicts. This instructor's manual points to articles and experiments you can implement in the classroom or online where appropriate.