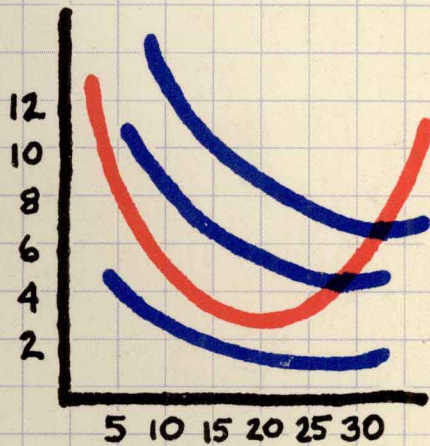


MICRO *Principles of Economics*

Fifth Edition
Willis L. Peterson



Principles of Economics

MICRO

Willis L. Peterson
University of Minnesota



Fifth Edition 1983

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Preface

This book is designed to be used as a core text in a one-quarter or one-semester course in microeconomics. It is intended for students who have either taken the macro principles course, or who have had no previous training in economics. Although the text takes the reader somewhat further along than has been customary in principles courses, the general reaction from the several thousand students I have taught using the first four editions of the text is that the material is challenging but not more difficult than that found in many of their other courses. Thus it seems that students are able to benefit from a slightly larger dose of economics than they traditionally have received in their principles courses. Because concepts and analysis of problems are emphasized as opposed to pure description, the text tends to be relatively compact. Therefore it is easy to underestimate the amount of material presented.

Probably the largest organizational change in this Fifth Edition over the Fourth is the removal of the discussion of the demand and supply shifters from Chapters 1, 3, and 5. All of the material on these shifters is now contained in Chapter 6, thus eliminating the repetition that formerly existed. Other significant additions and changes include an expanded overview of a market economy and the centrally planned economy in Chapter 1, coverage of income elasticity and cross elasticity of demand in Chapter 3 as well as cross elasticity of supply in Chapter 5, a more detailed derivation of long-run supply in Chapter 7, more information on differences in earnings between occupations and whether machines have displaced or replaced labor in Chapter 9, and the effect of inflation on expected internal

rates of return to conventional investment in Chapter 10 and to investment in education in Chapter 11. Of course, all the tables have been updated with the most recent figures available.

Comments and suggestions from the reviewers of the Fourth Edition—Boyd Collier of the University of Texas at Austin and Steven Klepper of Carnegie-Mellon University, other adopters, and my students have been most beneficial. My thanks to all.

Willis L. Peterson

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Introduction to microeconomics

“MICRO” VERSUS “MACRO” ECONOMICS

As economics developed into a discipline, two major areas of study emerged: micro and macro. Microeconomics is concerned mainly with the economic activities of individual consumers and producers or groups of consumers and producers known as *markets*. Macroeconomics, on the other hand, is concerned with economic aggregates or the economy as a whole. The two major problem areas of macroeconomics are unemployment and inflation. To be sure, these are of great concern to individuals, but they are also problems over which the individual has relatively little control. Both the causes and the solutions to these problems tend to lie in the realm of government action, which affects the entire economy.

It would be a mistake, however, to conclude that the micro and macro areas are distinct or unrelated fields of study. There is a certain amount of overlap between the two. For example, we will see in later chapters that much of what the government does in terms of enacting laws or levying taxes directly affects individuals and markets, and these effects can be analyzed with the tools of microeconomics. On the other hand, the actions of large groups of individuals, such as the increased desire to save on the part of many people, are analyzed with macroeconomic tools.

Because it is impossible to completely separate the micro from the macro, some economists argue that a more appropriate division would be price theory versus monetary and income and employment theory. In more advanced courses, particularly at the graduate level, microeconomic prin-

ciples are generally referred to as *price theory*, mainly because the material deals with the determination of prices and their effect on the output and input mix in the economy.

THE PROBLEM OF SCARCITY

In studying economics, as in any other activity, we like to have some reason for exerting effort. We attend the theater or go to a ball game because it is enjoyable. We attend school to learn or to make it possible to have a job and earn a living. But why study economics?

There may be a few people who would be willing to study economics purely for the enjoyment it brings. For most, however, learning economics is not 100 percent entertainment. To be sure, mastering a subject provides a certain amount of intellectual satisfaction, but it is hard to justify economics on only this basis. Crossword puzzles or chess might do just as well (or better) on this score. The social science of economics must rest on a different foundation. I have posed this question to my students and so far all have been too kind (or too smart) to say that we study economics because it is a required subject. But that would beg the question: Why is it required?

The answer we are looking for can be simplified to a single word—*scarcity*. Human wants are greater than the resources available to satisfy them. In fact, economists traditionally have argued that human wants are unlimited or insatiable. At first you may find this hard to believe. Surely, you might argue, there is some level of income or standard of living where one would be completely satiated. But if you spend a few hours, or even a few minutes, making a list of the goods and services that you wouldn't mind having, chances are their purchase would put a millionaire in a financial bind. Of course, you need not limit your list to the familiar "private" goods and services, such as housing, cars, or vacation trips. You might want to include cleaner air and water, or a comfortable and convenient public transportation system.

Suppose by some stroke of magic all the items on your list were supplied. Would you then be completely satisfied or satiated? Probably not, especially if everyone else also were granted their fondest wishes. Human nature being what it is, we always seem to be just a little dissatisfied with what we have. A new compact car may satisfy for a time, but eventually we would be giving admiring glances to a Mercedes or a Cadillac. In addition, we must remember that entirely new goods and services, many of which do not even exist in our imagination, will be developed and come on the market in the future, as they have in the past. A "dream list" prepared by your great-grandparents certainly would not have contained many of the items on your own list, simply because they were not even imagined at the time.

It is less difficult to envision the scarcity of resources at our disposal. In recent years attention has been drawn to the day when our nonrenewable natural resources, especially fossil fuels, will be exhausted. Although less newsworthy, it is important to realize that most resources, including land area, labor, and man-made capital such as buildings and machines, are in limited supply. Being finite, these resources can produce only a finite amount of goods and services. Since human wants appear to be much greater than the resources to satisfy these wants, people must decide what they will produce and what they will have to forgo. In other words, we are forced to make economic decisions.

ECONOMIC DECISIONS

We must make these decisions (or, if you wish, economize) from the time we are aware of the world around us. This harsh reality becomes apparent the first time a child stands in front of a candy counter clutching a dime or a quarter. The coin might buy a candy bar, a package of gum, or a roll of Lifesavers, but not all three. An economic decision must be made.

It would be misleading, though, to conclude that economic decisions all involve money. They do not. Probably the best example of a nonmonetary economic decision is how we allocate our time—a scarce resource that seems to become scarcer as we become older. The student must decide if he or she will spend the evening studying, say, mathematics or history, or, perhaps even more fundamentally, whether to devote time to study or to leisure. Allocating time to its best use is one of the most important economic decisions we have to make. It could well be one of the most important things learned in school.

More traditional types of economic decisions involve the operations of households and firms. For the household, a continuing array of economic decisions must be made on how to allocate the weekly or semimonthly paycheck. How much goes to housing, how much to food, clothing, transportation, entertainment, and so forth? Managing just a modest income for a family requires thousands of economic decisions each year.

Considering the complexity of a household's economic decisions, we can appreciate the decisions that must be made in managing a business firm. What kind of things should the firm produce? Should it specialize or diversify? Should it produce a large volume and sell at a low price or produce less and charge more? How do the decisions of rival firms affect each firm? Should the firm employ more labor and save on machines, or should it substitute machines for labor? These are some examples of economic decisions each manager must make. How well these decisions are made largely determines the success or failure of the firm.

The need to make economic decisions, of course, does not stop at the level of the household or firm. Economic decisions must be made at all

government levels, ranging from local governments, such as townships and municipalities, to the states and federal government. Perhaps the most basic of these economic decisions concerns how much of the total production of society is provided through the public sector and how much through the private sector. In a democracy, government decisions tend to reflect the broad wishes of society, but, of course, they cannot please everyone. People of a more conservative philosophy tend to desire a greater share of production in the private sector, while those of a more liberal bent stress the need for more public goods and services.

Once society settles on a mix between public and private goods, it must decide what kinds of public goods and services should be produced. For example, what is the appropriate mix between military and nonmilitary public goods? Should we have fewer weapons and greater public expenditures for slum clearance, public parks, pollution control, and so forth? Economic decisions involving governments or nations have this in common with those made by the child at the candy counter: Both require making a choice among alternatives, although one involves a dime or quarter, whereas the other may run into billions of dollars.

THE USEFULNESS OF THEORY

Economic theory has suffered from a bad press for many years, and not entirely without justification. Students tend to be turned off by theory because they visualize dry, abstract material that has little relevance to their world. But theory does not have to be dry or irrelevant. In fact, little is to be gained by theory if it cannot be of help in making day-to-day economic decisions or resolving economic problems.

The main value of theory is that it provides a framework for thinking. We need such a framework because the world is too complex to take into account every bit of information that affects a decision or problem, and we have to sort out the important from the unimportant. But information does not come in neat categories labeled "important" and "unimportant," nor is it always obvious which is which. For example, some goods or services increase in price during their peak seasons, such as Christmas cards and hotel rooms on Miami Beach. Other products decrease in price during the time of the year they are most actively bought and sold, such as fresh fruits and vegetables in the northern states. For some commodities, price rises when the quantity exchanged increases; for others, it declines when the quantity increases. To the person untrained in economics, there may appear to be very little order in markets. But after gaining an understanding of the theories of demand and supply (by the end of Chapter 6, I hope), you should be able to explain such phenomena and even predict future changes in price and the quantity of goods and services. In the latter sense, theory serves as a sort of "crystal ball."

Theory has come to be known by a number of names. One synonym is *principle*, as in the title of this book. A theory is also sometimes referred to as a *model*, probably because theory represents and predicts reality without necessarily duplicating it exactly or in detail.

In the use of economic theory it is common to see the phrases *other things equal* or *other things constant*. In order to simplify reality, it is useful to consider the effect of one factor at a time, in effect holding everything else constant, conceptually at least. This practice allows us to focus our attention on a specific point of interest, pushing into the background other factors or bits of information, even though these may also be important and be a part of the theory. It is recognized that in the real world there may be a number of important factors operating simultaneously. But if we tried to incorporate all of them at once into the analysis, it soon would become too complex to be of much use. Thus the other things equal phrase is not an attempt to distort the real world but rather an attempt to better understand and predict the world's events by making the theory more manageable and at the same time more powerful.

PRODUCTION POSSIBILITIES

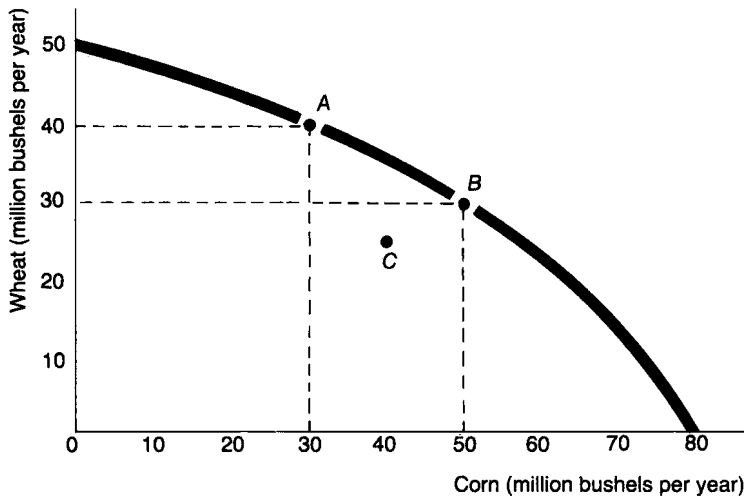
We have established that economics exists because we cannot have everything we would like and thus we are forced to make economic decisions. These decisions take the form of choosing among alternative goods or services those that will best satisfy our wants. Thus society must decide what to produce out of an almost infinite range of possibilities. Economists have traditionally represented this range of choices by what they call a *production possibilities schedule* (Table 1–1). This schedule can also be represented by a diagram (Figure 1–1) and called a *production possibilities curve*. Figure 1–1 is a representation or picture of the relationship expressed by the numbers in Table 1–1. Economics uses diagrams a great deal because a diagram is a relatively efficient and concise way of presenting an idea or concept.

The production possibilities schedule or curve is a way of illustrating the idea that a nation or individual faces limits on what can be produced and must make choices among many possible combinations of goods or services. In the simple example used here, if this nation devoted all its resources to the production of corn it could produce 80 million bushels of corn and nothing else. Or if all resources were devoted to wheat, 50 million bushels could be produced but no corn. The nation might like to have 50 million bushels of wheat *and* 80 million bushels of corn, but this combination is not possible because it does not have the resources to produce both. It would be more realistic, of course, for the country to choose some combination between the two extremes, say 40 million wheat and 30 million corn or 20 million wheat and 65 million corn. We will postpone for now just how a

TABLE 1-1 Production possibilities schedule

<i>Wheat</i> <i>(million bushels)</i>	<i>Corn</i> <i>(million bushels)</i>
0	80
10	75
20	65
30	50
40	30
50	0

FIGURE 1-1 Production possibilities curve



country goes about making this choice. The important point here is that such a choice must be made.

EFFICIENCY AND FULL EMPLOYMENT

The best economic condition that can be achieved is to be on the surface of the production possibilities curve. Any point outside the curve is by definition impossible. Essentially the curve bounds or defines what it is possible to achieve, but it would be a mistake to believe that a nation or an economy always achieves the possible. To be on the surface of the curve, say at point A or B, requires two conditions: (1) all production is carried on in the most efficient manner possible, and (2) all resources are fully employed.

You might ask what we mean by efficiency. Essentially there are two types, and both are necessary to be on the surface of the production possibilities curve. One, engineering efficiency, requires that maximum output is obtained from a given amount of resources; that is, resource waste is kept to a minimum. Economics generally is not concerned with engineering efficiency, leaving this to engineers and physicists. The other kind, economic efficiency, also is required to reach the surface of the curve. By economic efficiency we mean producing products that consumers most desire at the lowest possible cost. In the production of most products there is some opportunity to substitute one input for another. For example, in wheat production, if labor is priced high relative to machines, as is true in the United States, wheat production should be highly mechanized, utilizing machines to substitute for high-priced labor. A large part of this book is concerned with achieving economic efficiency.

The second major condition required to reach the surface of the production possibilities curve is full employment of resources. The resource that we are most concerned with is the human resource. If there are people who are unemployed but would like to be working, the economy is not getting the goods or services these people could produce. Thus unemployment is wasteful for society, and, of course, for the individual who is unemployed the loss of income is a critical problem. Much of the material in macroeconomics deals with achieving full employment.

Only an extremely unusual economy would be able to achieve both maximum efficiency and full employment. Most economies probably operate somewhat below the surface of the production possibilities curve. This does not prevent them, however, from striving to reach the maximum production possible, subject to environmental constraints and conservation needs. Much of the work in economics is concerned with helping society move toward its maximum possible output.

OPPORTUNITY COST

Assume that a simple economy is achieving maximum production so that it is now on the surface of the curve, say at point A in Figure 1-1. At this point it is producing 40 million bushels of wheat and 30 million bushels of corn per year. Suppose it wished to increase its production of corn, say up to 50 million bushels per year. To do this the nation would have to reduce its production of wheat from 40 to 30 million bushels. In other words, it would have to give up 10 million bushels of wheat to obtain the extra 20 million bushels of corn. Thus we can define *opportunity cost* as the amount of a good or service that must be given up to obtain more of another good or service.

Numerous combinations of goods or services might be used to illustrate opportunity cost. The only restriction is that two goods or groups of goods can be considered at a time because of the two-dimensional nature of the

diagram. This does not in any way make the idea less relevant or useful, however.

An important decision facing the United States at the present concerns the choice between military and nonmilitary goods and services. A decision to maintain a large military establishment means that the nation must forgo a certain amount of nonmilitary goods and services, such as housing, transportation, a cleaner environment, and so forth. These goods and services represent the opportunity cost of military goods. (You might want to illustrate this choice with a production possibilities curve. What happens to a nation's position on the curve when it goes to war, assuming it is on or near the surface of the curve?)

Every economy must make a decision between consumption goods (items consumed to satisfy present wants) and investment goods (items such as machines and structures that increase future output). A nation that decides to devote a large share of its output to investment goods must give up some consumption goods. The Soviet Union, which has emphasized the production of investment goods, is a good example of this case. Another choice that must be made is between agricultural and nonagricultural products. Nations that must devote a large share of their resources to produce food because of relatively unproductive agriculture by necessity must give up the production of other things such as housing, transportation, and medical care. The less developed nations of the world illustrate this case.

So far the examples of opportunity cost have focused on the national level, but the opportunity cost concept applies as well to the individual firm, household, and person. The firm that uses its plant to produce shoes cannot produce belts or basketballs. The family that spends its vacation at the seashore must forgo the opportunity to spend this time in the mountains. When you are reading this book you cannot be doing something else, such as reading a novel, studying mathematics, or sleeping. Thus the opportunity cost of studying economics is the novel you did not enjoy, the mathematics you did not learn, or the sleep you lost. Everything you do has a cost; nothing is absolutely free.

The idea of opportunity cost applies particularly to the choice between labor and leisure. For a person paid by the hour, the opportunity cost of going fishing or to a baseball game on a weekday afternoon is the wages forgone from a job. There is little chance that a person who values income highly or what it will buy will take off to go fishing, because the opportunity cost would be too high. Another individual might place a high value on leisure; the person who not only values freedom and leisure highly, but because of a lack of skills, can earn only a low wage will probably choose more leisure. Of course, wage earners who support a family generally take their welfare into account when deciding whether the value of their leisure is greater than the income forgone.

We should stress again the importance of being on or near the surface of the production possibilities curve. If a nation is experiencing substantial

unemployment, it may be able to increase its output of all goods and services simultaneously. This can be illustrated by Figure 1–1. If the nation is at point *C*, the movement to point *B* results in more of both corn and wheat. The same applies to an individual. Given the “gray matter” at your disposal, are you learning as much as possible during the hours you spend in class and studying on your own?

INCREASING OPPORTUNITY COST

Increasing opportunity cost refers to a situation in which *increasing* amounts of one good or service must be given up to obtain additional increments of another good or service. This idea is illustrated by the example in Table 1–1, but to illustrate it a bit more clearly, we have computed the cost of additional increments of wheat in terms of corn given up. These costs are presented in Table 1–2.

TABLE 1–2 Cost of wheat in terms of corn*

Increment of wheat (bushels)	Corn given up (bushels)	
	Total	Per bushel of wheat
First 10 million	5 million	$\frac{1}{2}$
Second 10 million	10 million	1
Third 10 million	15 million	$1\frac{1}{2}$
Fourth 10 million	20 million	2
Fifth 10 million	30 million	3

* Computed from Table 1–1.

Notice that in order to obtain the first 10 million bushels of wheat, this country had to give up 5 million bushels of corn (80 down to 75). Or, for each extra bushel of wheat obtained, one-half bushel of corn was given up. Suppose we go one step further and see what happens when this economy increases its wheat production from 10 to 20 million. Now corn production is reduced from 75 down to 65 million. In this step, for each extra bushel of wheat obtained, one bushel of corn is given up. At the range where we approach the maximum wheat, three bushels of corn are given up for each bushel of wheat obtained. Thus we see that the opportunity cost of a bushel of wheat increases from one-half bushel of corn to three bushels of corn.

The same thing would be true if we start at the bottom and move up. At first only one third of a bushel of wheat is given up per bushel of corn. At the top two bushels of wheat must be sacrificed to obtain an extra bushel of corn.

This idea of increasing cost is illustrated by the concave nature of the production possibilities curve shown in Figure 1–2. Note that when the