Chapter 2
Useful Tools and Concepts

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Chapter 2: Useful Tools and Concepts

Economists have developed a number of basic concepts that are useful when we want to describe how an economy works, and to think about how we, in our private roles and through government action, might make it work better. This chapter will present some of the most important concepts in economics, including how to approach trade-offs (when we have to choose among different things we might want); what markets really are (hint: they aren’t just one thing); and the importance, in economics, of such abstract things as trust and money. (You didn’t think money was abstract? Wait and see!) Before we get into these concepts, however, we’ll review economists’ basic tools of investigation. The concepts and methods we discuss in this chapter will reappear throughout the book and help us better understand modern macroeconomic debates.

1. Our Tools for Understanding

Explaining macroeconomic phenomena, we will see, involves using three main modes of investigation: empirical, theoretical, and historical.

Three main modes of investigation are empirical, theoretical, and historical.

1.1 Empirical Investigation

Empirical investigation is observation and recording of specific happenings in the world. It is convenient when the happenings of interest can be adequately described in terms of numerical data. However, useful empirical investigation of a specific item of interest may also be represented in words or images.

empirical investigation: observation and recording of the specific phenomena of concern

When the observations take the form of showing how a numerical economic variable changes over time, we call them time series data. We saw important examples of time series data in Chapter 1, in graphs that showed how production and atmospheric carbon dioxide levels have grown over time.

time series data: observations of how a numerical variable changes over time

We will be seeing many such graphs in this book—for price levels, employment, exchange rates and other economic variables. The accompanying Math Review box will help your refresh your skills in working with data and graphs.
Math Review: Graphing Empirical Data

To help you review your math skills, we will recreate a famous macroeconomic graph. The Phillips curve, originally derived by economist A.W. Phillips using British data, played a very important role in U.S. economic theorizing and policymaking, especially during the 1960s.

First, we can present the data in terms of a table. Table 2.1 presents data for the years 1963-1969, showing the average unemployment rate for the U.S. and the year-to-year inflation rate (i.e., the rate at which prices rose from one year to the next).

Table 2.1

<table>
<thead>
<tr>
<th>Year</th>
<th>Unemployment Rate (percent)</th>
<th>Inflation (percent per year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1963</td>
<td>5.7</td>
<td>1.1</td>
</tr>
<tr>
<td>1964</td>
<td>5.2</td>
<td>1.5</td>
</tr>
<tr>
<td>1965</td>
<td>4.5</td>
<td>1.8</td>
</tr>
<tr>
<td>1966</td>
<td>3.8</td>
<td>2.8</td>
</tr>
<tr>
<td>1967</td>
<td>3.8</td>
<td>3.1</td>
</tr>
<tr>
<td>1968</td>
<td>3.6</td>
<td>4.3</td>
</tr>
<tr>
<td>1969</td>
<td>3.5</td>
<td>5</td>
</tr>
</tbody>
</table>


We can interpret this data in visual form, by plotting each series separately on a time series graph, as shown in Figures 2.1 and 2.2. For example, the third point from the left in Figure 2.1 represents the fact that, in the year 1965, the unemployment rate was 4.5%. What does the point labeled with a question mark represent? Figure 2.1 presents a visual picture of the fact that unemployment fell fairly steadily throughout this period. Figure 2.2 reveals that inflation steadily rose.
During this period in the 1960s, the unemployment rate was generally falling.

During this period in the 1960s, the inflation rate steadily rose.

We might also be interested in how the two measures empirically relate to each other over time. For this, we can make a scatter plot graph, as shown by the dots in Figure 2.3. For example, the dot to the far right in this graph indicates that when the unemployment rate was 5.7%, inflation was 1.1%. The label on the point tells us that the year when this occurred was 1963. Interpret another point on the graph, with reference to Table 2.1, for practice.
Figure 2.3 The Empirical Relation between Unemployment and Inflation in the U.S., 1963-1969

The smooth line that can be fitted to data points such as these became known as the Phillips Curve.

When high values for one variable are associated with low values for the other (and low with high), we say the two variables have a negative or inverse relationship. On a scatter plot graph, such data points look as if they could be grouped around an (imagined) downward-sloping line. Conversely, when high values for one variable are associated with high values for another, and low with low, we say the two variables have a positive or direct relationship. On a graph, such a pattern of points suggests a upward-sloping line. Sometimes in empirical data such relationships, one way or the other, are very apparent. Other times, the data points may seem to be randomly scattered across a graph (or lie on perfectly horizontal or vertical lines), and so neither type of empirical relationship is apparent. If you study statistics and econometrics, you will learn how to describe empirical economic relationships (or the lack thereof) in a more formal and detailed way.

In the case of inflation and unemployment rates over this period in the 1960s, the data points seem to form a very clear pattern. We have added a smooth line to the graph that comes very close to going through every data point. Anyone looking at this graph would conclude that inflation and unemployment are negatively or inversely related in these data. It seems that low unemployment is associated with high inflation. The smooth line drawn in Figure 2.3 is the famous Phillips Curve.
**negative (or inverse) relationship:** the relationship between two variables if an increase in one is associated with a decrease in the other

**positive (or direct) relationship:** the relationship between two variables when an increase in one is associated with an increase in the other

It is tempting to think that if two economic variables have an empirical relationship with each other, that there must be some kind of underlying relation between the two – or, in particular, that changes in one variable must be causing changes in the other.

Sometimes this is true. In the case of the upward trends over time that we saw for both global production and carbon dioxide levels, as shown in Chapter 1, there is causality: Growing industrial production has led, over time, to increasing accumulations of CO$_2$. There are good scientific reasons to believe that the rise in accumulated carbon dioxide we observed in Figure 1.4 is a direct result of years of fossil-fuels-intensive economic growth, as we observed in Figure 1.1.

But two variables may be related empirically (or be “correlated” with each other, to use the statistical term) without there being a well-defined causal relationship between them. In the case of unemployment rates and inflation, graphed in the Math Review box, the two economic variables display a very strong empirical inverse relation for the period 1963-1969. As we mentioned in Chapter 1, many economists during this period came to believe that this association was based on an underlying causal relationship. They thought that the government could “trade off” inflation and unemployment, suffering a little more inflation in order to get more people working. That is, it was thought that the government could make unemployment rates fall by allowing some inflation.

The existence of an observable relationship between two economic variables does not imply that changes in one variable cause changes in the other. An important warning to keep in mind in all empirical work is that “correlation does not imply causality.”

We can see why this sort of thinking had to be modified when we add data points for later years. In 1970 inflation continued to rise slightly, to 5.3 percent, while the unemployment rate unexpectedly also rose, to 4.9%. As you can see in Figure 2.4, the idea that there was a clear, causal relationship between these two variables became far less plausible as the nation moved into the 1970s and 1980s!

Empirical investigation creates the foundation for relevant macroeconomic analysis. Looking at the puzzle presented by the data on unemployment and inflation, we can see, however, that more tools are clearly needed if economists are to try to explain, rather than simply describe, macroeconomic phenomenon.
Figure 2.4 The Empirical Relation between Unemployment and Inflation in the U.S., 1963-1983

The inverse relationship suggested by the Phillips Curve during the 1960s disappeared as the nation moved into the 1970s and 1980s.

1.2 Theoretical Investigation

The adjective “empirical” is usually contrasted with “theoretical,” where the latter refers to statements that are made on the basis of mental constructs and processes, such as assumptions and logical deductions. This book will introduce you, at length, to economists’ theories of macroeconomics.

As you will see, the theories we introduce are often based on “thought experiments.” Rarely having access to controlled laboratory experiments, as in the physical sciences, economists create theories based on assumptions about the economic agents and institutions, from which, with careful reasoning, they draw out potential implications for economic behavior.

| theoretical investigation: analysis based in abstract thought |

In the mid-1960s, for example, economists created theories that plausibly (that is, believably) explained how the downward-sloping Phillips curve might have come about. They made assumptions about how workers and investors would respond to monetary and fiscal policies and other economic conditions. They created plausible stories about a chain of events that would connect higher inflation to more people wanting to offer or accept jobs.

In order to make it possible to build a theory, it is sometimes useful temporarily to isolate certain aspects of economic behavior from their larger historical and
environmental context, in order to examine more closely the complex elements involved. A **model** is an analytical tool that highlights some aspects of reality while ignoring others. It can take the form of a simplified story, an image, a figure, a graph, or a set of equations, and it always involves simplifying assumptions. We’ll take a look at a couple of examples of economic models later in this chapter when we examine the Production Possibility Frontier and the basic neoclassical model. Other models will appear as examples throughout this course.

**model**: an analytical tool that highlights some aspects of reality while ignoring others

An important part of many models is the **ceteris paribus** assumption. This Latin phrase means “other things equal” or “all else constant.” In the models built around the Phillips curve relation in the mid-1960s, for example, one of the things “held constant” was people’s expectations about future inflation. The models assumed that even though inflation was rising steadily, people essentially wouldn’t notice. This assumption seemed to hold reasonably well for the period 1963-1969. Most economists now believe, however, that one of the main reasons for the jump in unemployment in 1970 was that people started to **expect** inflation, and to build inflation adjustments (such as cost-of-living raises) into the contracts they made for employment. The theory built around the Phillips curve assumed that something (expectations) would stay constant, and the theory provided a plausible description of reality only as long as this ceteris paribus assumption held. When it ceased to hold, new theories – now including an additional factor of expectations – were created.

**ceteris paribus**: a Latin phrase meaning “other things equal” or “all else constant”

Theorizing takes place in economists’ heads—hence the term “thought experiment.” “Is the resulting theory true?” you may rightly wonder. Generally, that is not a question that can be strictly answered “yes” or “no,” since our theories reflect only some selected aspects of the real world. Better questions to ask about economic theories include “Is the theory helpful in giving insight?” “Does it focus on things that we consider important?” Models can be useful – even though they require temporarily setting aside many complications and much of the larger context – when they are understood simply as tools to understanding, and when they remain open to revision as history evolves and new evidence is acquired.

1.3 Historical Investigation

Throughout the book, we will include a crucial third mode: Knowledge of **historical** events—observations of happenings in the near or distant past, within the context of what went before and what came after, that are broader than the more narrowly focused empirical investigation. The Great Depression of the 1930’s, any major war, the Bretton Woods monetary agreement of 1947, the oil crisis of 1973, the invention of computers, the entry of women into market work, and the growing concern about
environmental issues – all are examples of historical events that have had significant macroeconomic impact.

| historical investigation: study of past events |

Economists have become increasingly aware that, while gathering and analyzing data and thinking theoretically about what could be true are valid and important tasks, a knowledge of the real-world evolution of political, economic, and social life is indispensable to understanding macroeconomics.

Discussion Questions

1. Consider the following examples of investigation. For each one, indicate which mode of investigation it most closely represents – empirical, theoretical, or historical.
   a. a biologist tries to determine the number of different species of plants found on a plot of rainforest
   b. Albert Einstein develops his theory of relativity
   c. an economist measures how GDP varies across countries
   d. the political unrest in the United States during the 1960s and 1970s is explained to be primarily a result of the Vietnam War
   e. an economist states that a rise in inflation will lead to a fall in unemployment.

2. Model building is sometimes compared to map making. If someone asks you how to get to your house, what will you put on the map you draw for them? On the other hand, what if the question asked has to do with the location of the highest point in town, or the town’s political boundaries, or how your dwelling links up to the local sewer system? Is it possible for a single, readable map to answer every possible question? Does the goal you have in mind for the map affect what you put on it?

2. Economic Tradeoffs

   As individuals, and as members of a larger society, people make choices about what should be produced, how it should be produced, and for whom it should be produced.

2.1. Abundance and Scarcity

   When you think of all the abundant natural resources in our world, all the human time and intelligence that exist, all the investments that have been made in organizing human societies, and the massive stock of machinery and other productive resources now accumulated, you realize that the world is wealthy indeed. Although the distribution of resources is far from even, across countries or among people within countries, contemporary human society as a whole still has a rich resource base on which to build. No wonder that many world religions and ethical teachings encourage an attitude of gratefulness on the part of their adherents toward the sources of life’s abundance.
abundance: resources are abundant to the extent that they exist in plentiful supply for meeting various goals.

It may seem odd, then, that many economists emphasize the notion of scarcity – that is, the notion that there is too little to go around – when discussing society’s choices concerning what, how and for whom. What this really means is that even with all the available resources, and even with a steady eye on the goal of well-being, not everything that is socially desirable can be accomplished, at least not all at once.\(^1\) The current capacity of a particular hospital, for example, may allow it to increase the number of heart transplants it performs or increase the amount of care it can provide for the severely mentally ill, but not both. A given resource, like an hour of your time, when dedicated to one beneficial activity (like studying) will be unavailable for certain other beneficial activities (like relaxing with your friends). Choices have to be made.

scarcity: resources are scarce to the extent that they are not sufficient to allow all goals to be accomplished at once

Macroeconomics is centrally concerned with how an overall economic environment emerges from the choices made by individuals and organizations, and to what extent choices made by governments can make this economic environment better or worse.

2.2 Society’s Production Possibilities Frontier

Economists use the notion of a societal production possibilities frontier to illustrate concepts of scarcity, tradeoffs, choice, full employment, and efficiency.

The simplest version of this concept models an economy as if the only thing it has to consider is how to allocate its currently usable resources between the production of two possible flows of output over the coming year.\(^2\) The classic example is to take “guns” as one output, and “butter” as the other. In more general terms, the guns-and-butter tradeoff can refer to any society’s more general, and real-world, choice between becoming a more militarized society (“guns”) and becoming a more civilian- or consumer-oriented society (“butter”).

Figure 2.5 shows a production possibilities frontier (PPF) for this case. In this graph, the quantity of “butter” produced over a year is measured on the horizontal axis, or \(X\) axis. The quantity of “guns” is measured on the vertical axis, or \(Y\) axis. Every point on the graph represents a pair of quantities: one quantity of guns and another of butter.

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\(^1\) An alternative definition of scarcity, dating to the 1930s, defined resources as scarce relative to presumably unlimited human wants, without any question of whether these wants promoted well-being or not.

\(^2\) The resources considered to be available for economic production in the coming year will be only a portion of a society’s total resource stock. Some quantities of resources – for example, of nonrenewable mineral and energy resources – should be left idle this coming year in order to provide a base for production in years thereafter. The question of how to wisely decide how much should be regarded as available for production in the coming year is discussed in the following section.
point labeled A, for example, illustrates production, over the year, of 100 units of butter and 30 units of guns. Point B illustrates production of 50 units of butter and 120 units of guns. 

![Production Possibilities Frontier](image)

Figure 2.5 Society’s Production Possibilities Frontier

*As you select different points along the PPF you see that the more you get of one good, the less you can have of another.*

- **production possibilities frontier (PPF):** a curve showing the maximum amounts of two outputs that society could produce from given resources, over a given time period.

The curve shown on the graph is the standard depiction of a PPF. The point where the curve hits the vertical axis indicates what society could produce if it devoted all of its resources to producing guns and none to producing butter. Likewise, the point where the PPF hits the horizontal axis indicates how much butter society could produce if it decided to devote itself entirely to butter production and produced no guns.

The bowed-out shape of the curve comes from the important observation that some resources are likely to be more suited for production of one good than for the other.

We can see, for example, that we have only to give up a tiny bit of butter production to get the first 30 guns. Only a few workers, for example, need to be pulled out of butter production and set to work on plentiful supplies of the materials most suited for guns, such as easily tapped veins of iron ore and minerals for gunpowder. Gun manufacturing plants can be built on land unsuitable for pasture. Because those resources

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3 At this level of abstraction, it is not necessary to specific about what is meant by “units.” You may imagine these as tons of butter and thousands of guns, if you like. Also, it is possible to imagine PPFs that include more than two products—but they would have to be graphed in three (or more) dimensions. Note that, in relation to our earlier distinction, among historical, theoretical and historical forms of analysis, the PPF is best understood as a theoretical model. It can, however, be useful in understanding empirical data, from the past or the present.
had been left largely untapped when only butter was being produced, little is lost to butter production, while much is gained in guns.

On the segment between points A and B, there is a more nearly equal tradeoff, as the two processes start to compete for resources, such as land that might be used either for mining or for pasture, or the labor and materials that might be used either to build gun factories or to build dairy processing plants.

Movement from point B, into even greater gun production, comes at an increasing cost in terms of butter. The last few units of guns, from point B up to where the PPF hits the axis, come at the cost of nearly half the total possible production of butter! Why is this? Leaving even a few workers to tend the many cows and dairy plants would allow for a fair amount of butter production. Pulling even them out, and putting them to work on increasing less accessible veins of mineral ores, or on the now-crowded gun assembly lines, quickly erodes butter production while adding little to the production of guns.

Point C in Figure 2.5 represents a production combination that is not attainable, given existing resources. To produce at that point would take more resources than society has. The PPF is specifically defined so that only those points on or inside it represent outputs that can actually be produced.

Point D represents a case in which society is producing less than the full amount that it could, given the particular set of resources. Usually such a point is associated with unemployment, waste, or inefficiency.

In more general terms, we can think of points such as A and B, which are on the PPF, as reflecting socially efficient production, because, by definition, the production possibility frontier is a collection of points at which three socially important requirements are met. These are the following:

(a) No involuntary unemployment or undesired idle productive capacity. When economists talk about full employment of the labor force they do not mean that literally everyone is working as much as he or she can, but that everyone is working up to their potential and consistent with their desires. If the only people unemployed are those who are just very temporarily between employment situations, we would still say the economy enjoys “full employment.” People may choose not to work, or to work less than full-time. However, if people involuntarily stay unemployed for a significant period of time, or involuntarily work less than full-time, or work at jobs that fail to make good use of their skills, we would say that there is unemployment or underemployment. Some of society’s productive labor resources would be going to waste.

**full employment**: a situation in which everyone is working up to their potential and consistent with their desires. An economy may be considered to be at full employment even though some people may be temporarily in transition between jobs.
Analogously, in a fully efficient economy the available stock of manufactured capital resources (such as machinery) and natural capital resources (such as land and mineral deposits) will be used at optimal rates, so there is no unanticipated and undesired idle productive capacity. The existence of involuntarily idle labor and/or capital resources, which could be used to produce additional output, usually implies that an economy is operating at less than its potential.

(b) Application of optimal technology and social organization. The society is making use of the best technology and the best possible social organization of work.

Note that what is “optimal” in the use of both technology and social organization is highly context-dependent and may vary greatly from one society or one era to another. The best technique of production in any given instance will depend on the type and quantity of the available capital resources; what is best for a wealthy industrialized country will often differ from what is best for a poor or predominantly agrarian country. And the best social organization of work – for the purpose of motivating work effort and encouraging constructive interaction among workers – will depend on the nature and extent of the available resources, as well as on the overall culture of the society.

(c) Efficient resource allocation. An efficient process is one that uses the minimum value of resources to achieve the desired result. Put another way, efficiency is achieved when the maximum value of output is produced from a given set of inputs.

**efficiency:** the use of resources in a way that does not waste any inputs. Inputs are used in such a way that they yield the highest possible value of output, or a given output is produced using the lowest possible value of inputs.

In an efficiently run economy, the resources used in the society’s production processes are allocated within enterprises, and across enterprises and spheres of the economy, in such a way that each resource is deployed where it contributes most to desired production.

This condition is not met if reallocation of resources within enterprises, or across the whole economy, would enable society to produce increased quantities of desirable outputs. A particular enterprise may simply not use resources in accordance with the best technique. Perhaps, for example, the “gun” and “butter” activities are so badly managed that the very best pastureland was used to build the first gun factories. More of both could be produced simply by reassigning resources to their more appropriate uses. When prices accurately reflect relative values (for example, more productive pastureland costs more than that which is less productive) societies can avoid having to make such expensive changes by using the lowest-cost inputs for each process at the outset.
Whereas points inside the PPF illustrate waste or inefficiency, points along the PPF itself illustrate the important notion that scarcity creates a need for tradeoffs. Along the frontier, one can get more of one output only by “trading off” some of the other.

We can also see an illustration of the important concept of **opportunity cost**. The opportunity cost of an action is the value of the next best alternative—that is, the value of what might have otherwise have been done using the same resources. Looking at the PPF, we see that the cost of increasing gun production in this simple economy is less butter, and the cost of increasing butter production is fewer guns. On a more personal level, consider that there is always an opportunity cost to the use of an important resource—your own time. For example, your next best alternative to studying for an exam might be sleeping. If you choose to study you "pay" in lost sleep, while if you choose to sleep you "pay" in foregone studying. This doesn’t mean that every choice is the wrong one! Rather, it means that in assessing the cost of any choice it is necessary to consider not only the resources it will use up, but also the value of the best alternative use to which those resources could have been put.

**opportunity cost**: the value of the best alternative to a particular economic choice

These concepts could be illustrated in a simple, two-good world by graphing many other pairs of outputs, besides guns and butter, or sleep and studying. We could look at soda and pizza, cars and bicycles, or health and highways. However the classic guns and butter example is a good one. In the real world, such militarization/peacetime tradeoffs can be crucially important. (See the accompanying Economics in the Real World box.)

What precise combination of outputs should society choose to produce? To determine which point on the PPF would be best, we would have to have some way of figuring out which was preferable for the society. For good social decision making, these kinds of production questions would have to be considered together with questions of resource maintenance, distribution, and consumption, since all have effects on well-being. These economic decisions are strongly based on human values. In a society with free speech and democratic discussion, there is wide room for disagreement about what the best mix of goods might be. The PPF is a model that provides a mental image for thinking about tradeoffs, but it tells us little about how to choose among the possibilities.

2.3 Tradeoffs Over Time

We have said that a PPF reflects possible production combinations given a certain set of resources. This idea deserves more investigation. Do we mean that society should look at all the resources it has at a point in time and then strive to employ them to produce the absolute most of valued outputs over the coming year?
Economics in the Real World: Military expenditure — The Opportunity Cost


Even if they have never seen a gun, millions of children suffer from wars, as resources that could have been invested in development are diverted into armaments. Indeed, one of the most distressing realities of our time is that most wars have been fought in precisely those countries that could least afford them.…

Although the overall global decline [in military spending from 1987 to 1994], large amounts of scarce resources continue to be devoted to armaments. Between 1960 and 1991, total annual military expenditures by developing countries rose from US$27 billion to US$121 billion. Sadly enough, some of the steepest increases occurred in the poorest countries. Angola, Ethiopia, Mozambique, Myanmar, Somalia and Yemen have for many years spent more on their military than they have on their people’s education and health. Money spent on arms could have been put to much better use. The United Nations Development Program (UNDP) has estimated that redirecting just one quarter of developing countries’ military expenditure could have provided the additional resources to implement most of the year 2000 program: primary health care for all, immunization of all children, elimination of severe malnutrition, provision of safe drinking water for all, universal primary education, reduction of illiteracy, and family planning.

The industrialized countries must share responsibility since they are the dominant arms suppliers. The top five exporters to developing countries are the five permanent members of the United Nations Security Council. With the end of the cold war, the weapons industries in the rich countries are scrambling for new markets wherever they can find them—often with the enthusiastic support of their political leaders. While arms sales have dropped significantly in the last few years, sales to developing countries in 1994 still amounted to US$25.4 billion, all of which is money lost to development efforts. The largest single supplier has normally been the US.

If even a fraction of the resources devoted to building military capacity could be diverted to achieving basic development goals, we would soon be living in a world with fewer social and environmental problems and far fewer and less destructive wars.

If we consider that achieving well-being also involves questions of how and for whom, as well as activities of resource maintenance, production, distribution, and consumption, then the question becomes more complex – and more interesting. For example, we generally want to conserve resources so that we can produce goods not only right now but later in our lives. And we have an obligation to future generations to include them in our considerations of for whom.
Some production activities are also resource maintenance activities, of course, and the flow of output from these adds to the stock of resources available for the future. Investments in plant and equipment can provide productive capacity not just for a few months, but often for years. Production of goods and services that protect the environment, or that encourage the formation of new forms of knowledge and social organization, also lead to an improved resource base. As mentioned earlier, **technological progress** can lead to very long-run improvements in productive capacity. New technologies can create new, more efficient methods for converting resources into outputs – or even create new kinds of products, never before imagined. To the extent that production is of this sort, production can *add* to the production possibilities for the future. The PPF may expand over time, out and to the right, making previously unobtainable points obtainable, as shown in Figure 2.6.

| technological progress: the development of new products and new, more efficient, methods of productions

![An Expanded Production Possibilities Frontier](image)

**Figure 2.6 An Expanded Production Possibilities Frontier**

*When the PPF moves “out” (away from the origin) our choices are still constrained, but, overall, it becomes possible to get more of both things, as compared to the “lower” PPF.*

Some productive activities contribute an ongoing flow of outputs without drawing down the stock of capital resources. Sustainable production activities, such as some agricultural and forestry processes when they are suitably planned and carried out, may not add to the resource base, but neither do they deplete it.

But many other productive activities lead to resource depletion or degradation. The intensive use of fossil fuels is now depleting petroleum reserves, degrading air quality, and contributing to global climate change. Production processes that destroy important watersheds and wildlife habitats are also resource-depleting. Mind-numbing drudgery, or work in dangerous circumstances, can degrade human resources by leaving
people exhausted or in bad mental or physical health. These kinds of productive activities are at odds with resource maintenance.

Taking a longer-term view, then, it is clear that getting the absolute most production, right now, out of the available resources is not an intelligent social goal. Decisions like guns vs. butter need to be accompanied by another decision about now vs. later. What needs to be currently produced, what needs to be maintained, and what investments are needed to increase future productivity?

Figure 2.7 shows a production/maintenance frontier, which illustrates the tradeoff between resource-depleting kinds of production and resource maintenance activities (the latter including both conservation and investment). Point A illustrates a societal decision to engage in considerable resource-depleting production in the present year, while putting little emphasis on maintenance for the future. Point B illustrates a decision to engage in a higher level of maintenance this year and in a lower level of resource-depleting production. Point C is, again, truly unobtainable (for now), and Point D illustrates a case of inefficiency or wasteful unemployment.

The consequences of choosing between points A and B are illustrated in Figure 2.8, where once again we portray a two-output (like guns-vs.-butter) PPF. Now, however, the depiction is of some time in the future, following the current choice between A and B. As Figure 2.8 shows, a decision to maintain more for the future, by choosing point B in Figure 2.7, leads to a larger set of production possibilities in future years. A decision to engage in considerable resource depletion, by choosing point A in Figure 2.7, leads to the smaller future PPF shown in Figure 2.8.

Of course, some will argue that advances in technology (which we have included as a resource-maintaining type of production) will always push out the PPF (as in Figure
2.6) more than resource depletion will pull it in (as in Figure 2.8). But this is no more than an assertion of belief. If this belief turns out not to be warranted, then acting on the basis of it may lead to large-scale, unfortunate, and irreversible consequences.

![Figure 2.8 Possible Future PPFs](image)

**Figure 2.8 Possible Future PPFs**

*Present-day decisions about how to produce will affect future possibilities concerning what can be produced.*

**Discussion Questions**

1. Suppose that your time for studying can be allocated to either studying for this course or studying for another course. Your two “outputs” are your grade in each course. Draw a production possibilities curve for these two outputs. Would the curve be shaped like the PPF in Figure 2.5? Discuss.

2. Consider the following activities. Which ones do you think would expand society’s PPF in the future? Which ones would shrink it? (There may be room for disagreement on some.)
   
   a) increasing education spending  
   b) increasing the production of sport utility vehicles  
   c) building a nuclear power plant  
   d) restoring wetlands  
   e) building a new interstate highway  
   f) expanding Internet capacity

3. **The Role of Markets**

   As we saw in Chapter 1, one of the major areas of interest – and dispute – among economists concerns how markets function. Those who develop theories along the lines of classical economics believe that market systems function fairly smoothly and are largely self-regulating. Those who lean more towards the Keynesian side believe that
market economies need some help from government policy to serve goals of human well-being. But what do economists mean by “markets”?

3.1 The Meaning of Markets

When people talk about markets, they may be referring to a number of different meanings of the word, from very concrete to very abstract. In the language of economics there are at least three different uses of the word "market," and the appropriate meaning must be judged from the context in which it appears. We will start with the most concrete and move toward the more abstract definitions.

The most concrete and commonsense definition of a market is the idea that a market is a location — that is, a place where people go to buy and sell things. This is historically appropriate: Markets such as the Grand Bazaar in Istanbul, or African village produce stands, have flourished for ages as meeting places for people who wish to make exchange transactions. The same criterion applies today, even when the “market” has become a shopping center or mall, with many retail stores sharing one huge building, or a stock or commodity exchange, where brokers stand on a crowded floor and wave signals to each other. A market, as suggested by these examples, can be defined as a physical place where there is a reasonable expectation of finding both buyers and sellers for the same product or service.

**market (first meaning): a physical place where there is a reasonable expectation of finding both buyers and sellers for the same product or service.**

However not all markets are physical places where buyers and sellers interact. We can think of markets in more general terms as institutions that bring buyers and sellers together.

**Institutions** are ways of structuring the interactions between individuals and groups. Like markets, institutions can also be thought of in concrete or abstract terms. A hospital can be considered an institution that structures the interactions between doctors and patients. A university is an institution that structures the interactions between professors and students. But institutions can also be embodied in the customs and laws of a society. For example, marriage is an institution that places some structure on family relationships. Laws, courts, and police forces are institutions that structure the acceptable and unacceptable ways that individuals and groups interact.

**institutions: ways of structuring the interactions between individuals and groups, including both formally constituted establishments and the generally recognized patterns of organization embodied in customs, habits, and laws.**

When we think of markets as institutions, we see that a market does not need to be a physical location. Internet auctions, such as eBay, are market institutions that bring buyers and sellers together. The New York Stock Exchange can be considered both a physical location – a building on Wall St. where brokers buy and sell stocks – and an
institution where investors all over the world interact indirectly according to a set of established rules and structures.

**market** (second meaning): an institution that brings buyers and sellers into communication with each other, structuring and coordinating their actions

Thinking of markets as institutions, rather than concrete places, leads to various ways of discussing *particular* markets. Many economists spend much of their time investigating one or more such specific institutional markets. They may track the trades made at various prices over time for a specific good, like heating oil or AT&T bonds, try to forecast what might happen in the future, or advise on the specifics of market structures. When such an economist speaks of a market, he or she most often means the institutional market for such a specific good.

In this sense, several different markets may operate under one roof, within the same organization. For example, in the United States the Chicago Board of Trade operates many markets for a variety of farm products, including wheat, corn, and soybeans, among many others. Indeed, even a term like "wheat" may be too general to define a market for some purposes, given the existence of such distinct varieties as "No. 2 dark winter wheat" and "No. 1 dark northern spring wheat." Or such an institutional market might cover a number of different physical locations, such as when an economist speaks of a market in regional terms. The “New England market for home heating oil,” for example, may involve transactions by a number of different companies at a number of different physical locations.

In the most abstract terms, people sometimes talk of “the market” as a situation of idealized unencumbered exchange. Without reference to either physical places or social institutions, buyers and sellers are imagined to come to instantaneous, costless agreements. This definition of the market may refer to all market relationships at a national or even global level. When economists speak of the merits (or limitations) of “free markets,” they are referring to the concept at this level of abstraction. Often what people have in mind in this case is not so much specific, institutional markets as a particular model of how markets *could* behave, in an ideal case. Economists who have a “pro-market” view believe that markets should generally be left to function with very little government intervention in order to maximize economic prosperity. They may claim, for example, that problems of environmental protection can and should be solved by “the market.” Others recognize the effectiveness of markets but believe that problems such as poverty, inequality, environmental degradation, and declines in social ethics may be caused or exacerbated by unchecked and unregulated markets.

**“the market”** (third meaning): a phrase that people often use to mean an abstract situation of pure exchange or a global system of exchange relationships
3.2 The Basic Neoclassical Model

The **basic neoclassical model**, traditionally taught in detail in most microeconomics courses at the introductory level, is a model of market exchange that – while abstracting away from many real-world factors (some of which are discussed below – portrays in a simple and elegant way some important aspects of markets. Neoclassical economics arose during the late 19th and early 20th century. It took the earlier classical idea that economies can be thought of as systems of smoothly-functioning markets, and expressed this idea in terms of formalized assumptions, equations and graphs. (The prefix “neo-“ means “new.”)

In this model, the world is simplified to two kinds of economic actors. Households are assumed to consume and to maximize their utility (or satisfaction). Firms are assumed to produce and to maximize profits. Households are considered to be the ultimate owners of all resources, and they sell or rent these to firms, receiving monetary payments in return. Firms produce goods and services, which they sell to households in return for monetary payments. This model can be portrayed in the circular flow diagram in Figure 2.9. The model further assumes that there are so many firms and households involved in the market for any good or service that a situation of “perfect competition” reigns, in which prices are determined purely by forces of supply and demand.

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**basic neoclassical model:** a simple, mechanical model that portrays the economy as a collection of profit-maximizing firms and utility-maximizing households interacting through perfectly competitive markets

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**Figure 2.9 The Circular Flow Diagram for the Basic Neoclassical Model**

*The neoclassical circular flow diagram represents a model in which there are only two kinds of economic actors, interacting through markets.*

---

4 This may also be called the “traditional microeconomic model.”
In this idealized world, goods and services are produced, distributed, and consumed in such a way that the market value of production is as high as it can be. The model combines important observations about markets with assumptions about human values and human behavior (as both producers and consumers). (In reading through the following statements, see if you can recognize which parts are “positive” observations of facts, and which are assumptions, which may include a “normative” slant, towards “the way things ought to be.”) Full social and economic efficiency is said to arise because:

- The prices set by the forces of supply and demand in smoothly functioning markets carry signals throughout the economy, coordinating the actions of many individual decision-makers in a highly decentralized way.
- The profit motive gives perfectly competitive firms an incentive to look for low-cost inputs and convert them into highly valuable outputs. Production decisions are thus made in such a way that resources are put to their most (market) valuable uses.
- Consumption decisions made by individuals and households are assumed to maximize the “utility” or satisfaction of consumers.
- Maximizing the market value of production is assumed to be a reasonable proxy for maximizing human well-being

Extending the model to include international trade, the story of “comparative advantage,” which we will present in a later chapter, similarly demonstrates how specialization and trade may lead to a greater (market) value of production on an international scale, compared to a situation in which each country produces only for itself.

3.3 The Advantages of Markets

Economies that rely heavily on markets to coordinate production, distribution, and consumption have certain important advantages over the main recent historical alternative to markets, central planning.

The bureaucratic socialist systems that used to exist in the former Soviet Union and Eastern Europe, for example, were notorious for their inefficiency in resource allocation – both within enterprises and across the whole economy. According to economic historian Alec Nove, Soviet economic planning at its peak spelled out production targets for almost 50,000 commodities, involving a staggering and virtually unmanageable level of detail. Separate production decisions had to be made for the millions of distinguishable commodities in the Soviet Union (e.g., every size for each different style of shoes). A large bureaucracy had to be established to run all this. The economy was steered very much toward heavy industry and military production – allowing the Soviet Union to become a world power – while neglecting consumer goods
and agriculture. Dissatisfaction with the results of this centrally-controlled system contributed greatly to its collapse in 1992.

Because information and decision-making in a market economy is decentralized, and producers have an incentive to respond to consumer desires, market systems can lead to a more efficient use of resources than entirely centrally planned economic systems. While the workings of real-world markets are more complex, the principle of efficiency highlighted in the basic neoclassical model is of great importance.

The fact that market exchange is voluntary, not coerced, is often considered to be an additional advantage of markets. While most people are in some sense forced to offer their labor for pay in order to survive in a market economy, market systems generally offer people some choice about where they work and what they buy. Other market advocates claim that, by offering financial incentives, markets encourage people to be creative, innovate, and communicate with each other.

However, it is one thing to recognize that markets have advantages, and another to claim that markets are always the best way to organize economic activity.

Classically-minded macroeconomists tend to emphasize potential efficiency gains from markets, and stay fairly close to the basic neoclassical model in their theories. They tend to believe that most economic decisions should be left to “free markets.”

More Keynesian-oriented macroeconomists, on the other hand, tend to emphasize how real-world markets might differ from the smoothly functioning markets that exist in theory. Real-world markets require an impressive set of associated institutions to work well, they point out. And markets on their own are not well-suited to addressing certain kinds of economic problems.

3.4 The Institutional Requirements of Markets

Contemporary large-scale markets do an amazing thing: they allow many, many separate decision makers, acting from decentralized information, to coordinate their behavior, resulting in highly complex patterns of voluntary exchange transactions. They do not, however, operate in a vacuum. Economists have identified a number of even more basic institutions that market institutions require in order to function. We will classify these in four broad groups: individualist institutions related to property and decision making; social institutions of trust; infrastructure for the smooth flow of goods and information; and money as a medium of exchange.

Markets require individualist institutions related to property and decision making, social institutions of trust, infrastructure for the smooth flow of goods and information, and money as a medium of exchange.

Individualist institutions related to property and decision making. For markets to work, people need to know what belongs to whom. Private property is the ownership of
physical or financial assets by nongovernment economic actors. Actors must also be allowed to make their own decisions about how to allocate and exchange resources. Prices, in particular, must not be under the complete control of guilds or central bureaus, but must, rather, generally be allowed to be set by the interactions of market participants themselves.

**private property:** ownership of assets by nongovernment economic actors

The institutions of private property and individualist decision making exist both formally, as in codes of law, and informally, in social norms. For example, some Western economists expected markets to grow quickly in the countries of the former Soviet Union as soon as communism was dismantled and opportunities for markets opened up. However, many people were accustomed to being told where to work and what to do by the state. Norms of individual initiative and entrepreneurship, it turns out, do not just arise naturally but need to be fostered and developed.

**Social institutions of trust.** A second critical institutional requirement for markets is that some degree of trust must exist between buyers and sellers. When a buyer puts down her payment, she must trust that the seller will hand over the merchandise and that it will be of good quality. A seller must be able to trust that the payment offered is valid, whether it is in the form of currency, personal check, credit card charges, or other kinds of promise of future payment. Social institutions must be created to reduce the risk involved.

Again, trust is an institution that exists both in social norms and formal establishments. Cultural norms and ethical or religious codes can help establish and maintain an atmosphere of trustworthiness. One-on-one exchanges between customers and businesses help build trust and make future transactions smoother. Many companies have built up a reputation for making quality products or providing good service. Marketers try to capitalize on the tendency of buyers to depend on reputation by using advertising to link certain expectations about quality and price to a recognizable brand name and thus creating “brand loyalty” among repeat customers.

In modern complex economies, contracts are often needed to define the terms of an exchange. An informal or *implicit contract* exists when the terms of an exchange are defined verbally or through commonly-accepted norms and traditions. *Explicit contracts* are formal, usually written, agreements that provide a legally-enforceable description of the agreed-upon terms of exchange. For formal contracts to work, there must be laws that define contracts, state the legal obligation to honor contracts, and establish penalties for those who fail to do so and a system for enforcing those laws.

**implicit contract:** an informal agreement about the terms of exchange, based on verbal discussions and on common norms, traditions, and expectations

**explicit contract:** a formal, often written, agreement that states the terms of exchange and may be enforceable through a legal system.
In highly marketized economies many other institutions have evolved to deal with the issue of trust. For example, credit bureaus keep track of consumer credit trustworthiness, Better Business Bureaus keep track of complaints against businesses, “money back” guarantees give consumers a chance to test the quality of a good before they commit to purchasing, and escrow accounts provide a place where money can be put until goods or services are delivered. Government agencies like the U.S. Food and Drug Administration and local boards of health are charged with monitoring the quality and purity of many goods that are sold.

However, even in complex transactions among large groups of strangers, social norms are still essential. Detailed formal contracts are costly to write and costly to enforce. It is not practical to police every detail of every contract, and it is impossible to cover every conceivable contingency. The legal system can work smoothly only if most people willingly obey most laws and believe that it is dishonorable to cheat. In effect, relationships, social norms, and the governmentally-created apparatus of law are institutions that must exist side by side, reinforcing one another. None of these alone can carry the whole burden of making complex contracts work, and hence make markets possible.

In the smooth flow of goods and information. A third set of basic institutions for market functioning have to do with making possible a smooth flow of goods and information. Most obviously, there needs to be a system of physical infrastructure for transportation and storage that provides the basic foundation for moving goods around. Such infrastructure includes roads, ports, railroads, and warehouses in which to store goods awaiting transport or sale. This sort of infrastructure can be most noticeable when it is absent, as in economies ravaged by war.

**physical infrastructure**: the equipment, buildings, physical communication lines, roads and other tangible structures that provide the foundation for economic activity

In addition, there needs to be infrastructure in place for the flow of information. Producers and sellers need information on what, and how much, their customers want to buy; in a well-functioning marketized economy, this information indicates what, and how much, should be produced and offered for sale. At the same time, consumers need to know what is available, and how much of something else they will have to give up (i.e., how much they will have to pay) to get the products that are on the market. In fact, ideally consumers should be able to compare all potential purchases, as a basis for deciding what to acquire and what to do without.

Money as a medium of exchange. The final critical institution required for markets to operate smoothly is a generally accepted form of money. Gold, silver, and other metal coins were the most common type of money for many centuries; more recently, paper currency has become important. Today, financial instruments such as bank account balances play an even larger role. While once backed by precious metals in Fort Knox, the value of a U.S. dollar is now based only on the understanding that other people will
take it in exchange. In this sense, money is also a social institution of trust, as well as part of the institutional infrastructure of functioning markets. Money will be discussed at greater length in Chapter 11.

3.5 The Limitations of Markets

Real-world choices are not limited to either a system where a centralized government exerts total control, or the radically “free market” system described in the basic neoclassical model. Actual market-oriented economies always include a mixture of decentralized private decision-making and more public-oriented decision-making.

This is not because voters and government officials are not aware of the advantages markets can have in helping an economy run efficiently. Rather, it is because in real world economies there are a number of important, complex factors that are not taken account of in the basic neoclassical model. We will discuss these issues more fully in later chapters; here we briefly define and discuss some of the major factors which are important for macroeconomics. These include: public goods, externalities, transaction costs, market power, questions of information and expectations, and concerns for human needs and equity.

Economic systems cannot rely solely on “free markets” to organize activity because of factors including public goods, externalities, transaction costs, market power, questions of information and expectations, and concerns for human needs and equity.

Public goods. Some goods cannot, or would not, be well-provided by private individuals or organizations acting alone. A public good (or service) is one where the use of it by one person does not diminish the ability of another person to benefit from it (“nondiminishable”), and where it would be difficult to keep any individuals from enjoying its benefit (“nonexcludable”).

**public goods:** goods for which (1) use by one person does not diminish usefulness to others, and (2) it would be difficult to exclude anyone from benefiting

For example, if a local police force helps make a neighborhood safe, all the residents benefit. Public roads (at least those that are not congested and have no tolls) are also public goods, as is national defense. Education and quality childcare are public goods because everyone benefits from living with a more skilled and socially well-adjusted population. A system of laws and courts provides the basic legal infrastructure on which all business contracting depends. Environmental protection that makes for cleaner air benefits everyone.

Because it is difficult to exclude anyone from benefiting, public goods cannot generally be bought and sold on markets. Even if individual actors would be willing to pay if necessary, they have little incentive to pay because they can’t be excluded from the benefit. Economists call people who seek to enjoy a benefit without paying for it free riders. Because of the problem of free riders, it often makes sense to provide public
goods through government agencies, supported by taxes, so that the cost of the public benefit is also borne by the public at large. The effect of taxation and government spending on the macroeconomic environment will be an important theme in this book.

**free riders:** people who seek to enjoy the benefit of a public good without paying for it

*Externalities.* Other activities, while they may involve goods and services that are bought and sold in markets, create *externalities.* Externalities are side effects or unintended consequences of economic activities. They affect persons, or entities such as the environment, that are not among the economic actors directly involved in a particular economic activity. These effects can be positive or negative. Sometimes positive externalities are referred to as “external benefits” and negative externalities are referred to as “external costs.” Externalities are one of the primary ways in which the true *social* value of a good or service may differ from its *market* value.

**externalities:** side effects or unintended consequences, either positive or negative, that affect persons, or entities such as the environment, that are not among the economic actors directly involved in the economic activity that caused the effect.

Examples of negative externalities include a manufacturing firm dumping pollutants in a river, decreasing water quality downstream; or a bar that plays loud music that annoys its neighbors. Examples of positive externalities include the fact that parents who, out of love for their children, raise them to become decent people (rather than violent criminals) also create benefits for society at large; or the way in which one person getting vaccinated against a communicable disease to protect himself or herself also protects people around him or her from the disease’s spread. In both cases, there are social benefits from individual actions. Well-educated, productive citizens are an asset to the community as well as to their own families, and disease control reduces risks to everyone.

Some of the most important externalities have to do with the economic activity of resource maintenance. Relying on markets alone to coordinate economic activities allows many activities to happen that damage or deplete the natural environment, because the damage often does not carry a price tag and because people in future generations are not direct parties to the decision-making.

If economic activities affected only the actors directly involved in decision-making about them, we might be able to think about economic activity primarily in terms of individuals making decisions for their own benefit. But we live in a social and ecological world, in which actions, interactions, and consequences are generally both widespread and interknit. If decisions are left purely to individual self-interest, then from a societal point of view too many negative externalities will be created, and too few positive externalities. The streets might be strewn with industrial wastes, while children might be taught to be honest in dealings within their family, but not outside of it. Market values and human or social values do not always coincide.
**Transaction costs.** Transaction costs are the costs of arranging economic activities. In the basic neoclassical model, transaction costs are assumed to be zero. If a firm wants to hire a worker, for example, it is assumed in that model that the only cost involved is the wage paid. In the real world, however, the activity of getting to a hiring agreement may involve its own set of costs. The firm may need to pay costs related to searching, such as placing an ad or paying for the services of a recruiting company. The prospective worker may need to pay for preparation of a resume and transportation to an interview. One or both sides might hire lawyers to make sure that the contract terms reflect their interests. Because of the existence of such costs, some economic interactions that might be lead to greater efficiency, and that would occur in an idealized, transaction-cost-free, frictionless world, may not happen in the real world.

**market power:** the ability to control, or at least affect, the terms and conditions of the exchanges in which one participates

**Businesses may also gain power by their sheer size – many corporations now function internationally, and have revenues in the tens of billions of dollars. The decisions of individual large corporations can have substantial effects on the employment levels, economic growth, living standards, and economic stability of regions and countries. Governments may need to factor in the responses of powerful business groups in making their macroeconomic decisions. National leaders may fear, for example, that raising business tax rates or the national minimum wage may cause companies to leave their country and go elsewhere. Corporations frequently also try to influence government policies directly, through lobbying, campaign contributions, and other methods. We will explore the implications of corporate globalization for macroeconomic policy at more length in a later chapter.**

**Information and expectations.** In the basic neoclassical model, in which purely decentralized decisions lead to efficient outcomes, people are assumed to have easy access to all the information they need to make good choices. This analysis is static; that is, it deals with an idealized case in a timeless manner. The model doesn’t consider the time it might take for a person to make a decision, or the time it might take for a factory to gear up to produce a good. In the real, dynamic, world, getting good information may
be difficult, and planning for an uncertain future is a big part of anyone’s economic decision-making.

**static analysis:** analysis that does not take into account the passage of time

**dynamic analysis:** analysis that takes into account the passage of time

A manufacturing business, for example, might be considering whether or not to borrow funds to build an additional factory. If the company’s directors were able to know in advance exactly what demand for its products will be like in the future and what interest rates will be – along with additional information about things like future wages, energy costs, and returns on alternative investments – the decision would be a simple matter of mathematical calculation.

But the directors will have to guess at most of these things. They will form expectations about the future, but these expectations may turn out to be correct or incorrect. If their expectations are optimistic, they will tend to make the new investment and hire new workers. Often optimism is “contagious,” and if a lot of other business leaders become optimistic, too, then the economy will boom. If, on the other hand, people share an attitude of pessimism, they may all tend to cut back on spending and hiring.

Since no one business wants to take the risk of jumping the gun by expanding too soon, it can be very difficult to get a decentralized market economy out of a slump. How people get their information, how they time their actions, and how they form their expectations of the future, then, are all important topics in macroeconomics that are not addressed in the basic neoclassical model. Taking these factors into account means that sometimes markets do not work as smoothly as that model suggests.

*Human needs and equity.* In the basic neoclassical model, the only consumer demands for goods and services that count are those that are backed up by a consumer’s ability to pay. This has several implications.

First, there is nothing in the model that assures that resources are distributed in such a way that people can meet their basic human needs. If a few rich people have a lot of money to spend on diamonds, for example, while a great number of poor people lack the money to pay for basic health care, “free markets” will motivate producers to respond to the demand for diamonds, but not to the need for basic health care. More deliberate policies of economic development, government provision, subsidies, or income redistribution – sometimes incorporating, or sometimes replacing, market means – are often enacted to try to ensure that decent living standards become more widespread.

Second, the model does not take into account non-marketed production, such as the care given to children, the sick and the elderly by family and friends. There is nothing in the basic neoclassical model that assures that these sorts of production will be supplied in adequate quantities and quality.
Lastly, it is also the case that problems like unemployment and inflation usually tend to affect some people more than others, so that how a country deals with these problems also has distributional consequences.

Clearly, although market systems have strong advantages in some areas, they cannot solve all economic problems. Economists sometimes use the term **market failure** to refer to a situation in which a market form of organization would lead to inefficient or harmful results. Because of the existence of public goods, externalities, transaction costs, market power, questions of information and expectations, and concerns for human needs and equity, macroeconomic systems cannot rely on “free markets” alone if they are to generate human well-being.

**Market failure**: a situation in which markets yield inefficient or inappropriate outcomes.

To some extent private non-market institutions may help remedy “market failure.” For example, a group of privately-owned factories located around a lake may voluntarily decide to restrict their waste emissions, because too much deterioration in water quality hurts them all. Likewise, a widespread custom of private charitable giving may help alleviate poverty. But sometimes the problems are so large or widespread that only governmental, public actions at the national or international levels seem to offer a solution. Exactly how much governmental action is required, and exactly what governments should do, however, are much-debated questions within contemporary macroeconomics.

**Discussion Questions**

1. In what sense is the term “market” being used in each of the following sentences? “Go to the market and get some bananas.” “The market is the best invention of humankind.” “The labor market for new Ph.D.’s is bad this year.” “The advance of the market leads to a decline in social morality.” “The market performance of IBM stock weakened last month.” Can you think of other examples from your own readings or experience?

2. “Indeed it has been said that democracy is the worst form of Government,” said British Prime Minister Winston Churchill (1874–1965), “except all those other forms that have been tried from time to time.” Some people make the same claim about more marketized forms of economic systems. What do they mean? Would you agree or disagree?

**Review Questions**

1. What are the three main modes of economic investigation? Describe each.
2. What is a model? How does the ceteris paribus assumption simplify the creation of a model?
3. How do abundance and scarcity create the possibility of, and the necessity of, economic decision-making?
4. What three requirements are met in producing along a production possibilities frontier?

5. Draw a societal production possibilities frontier, and use it to explain the concepts of tradeoffs (opportunity cost), attainable and unattainable output combinations, and efficiency.

6. What kinds of decisions would make a PPF expand over time? What kinds of decisions would make it shrink over time?

7. What are the three different meanings of the term “markets?”

8. What are some of the assumptions of the basic neoclassical model? Why are markets said to be efficient according to this model?

9. What are the four institutional requirements of markets?

10. What is a public good? Why will private markets generally undersupply public goods?

11. What are negative and positive externalities? Give examples of each.

12. Besides public goods and externalities, describe four real world factors which can cause market outcomes to be less than ideal.

**Exercises**

1. Consider the following data, taken from the Economic Report of the President 2004. Perform the graphing exercises below using either pencil and graph paper or a computer spreadsheet or presentation program.

<table>
<thead>
<tr>
<th>Year</th>
<th>Unemployment Rate (percent)</th>
<th>Inflation (percent per year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>7.5</td>
<td>2.3</td>
</tr>
<tr>
<td>1993</td>
<td>6.9</td>
<td>2.3</td>
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<tr>
<td>1994</td>
<td>6.1</td>
<td>2.1</td>
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<td>5.4</td>
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<tr>
<td>1997</td>
<td>4.9</td>
<td>1.7</td>
</tr>
<tr>
<td>1998</td>
<td>4.5</td>
<td>1.1</td>
</tr>
<tr>
<td>1999</td>
<td>4.2</td>
<td>1.4</td>
</tr>
</tbody>
</table>

   a. Looking at the data listed in the chart, can you detect a trend in the unemployment rate during these years? In the inflation rate? If so, what sort of trends do you see?
   c. Create a scatter plot graph with the unemployment rate on the horizontal axis and inflation on the vertical axis.
   d. Using your graph in part (c), do the two variables seem to have an empirical relationship during this period, or do the points seem to be randomly scattered? If there appears to be an empirical relationship, is it inverse or direct?
   e. How does the empirical relationship between unemployment and inflation in this period compare to the period 1963-1969 (discussed in the chapter)?

2. The notion of “scarcity” reflects the idea that resources cannot be stretched to meet all the goals that people desire. But what makes a particular resource “scarce”? If there
seems to be more of it around than is needed (like desert sand), is it scarce? If it is freely open to the use of many people at once (like music on the radio waves), is it scarce? What about resources like social attitudes of trust and respect? Make a list of a few resources that clearly are “scarce” in the economists’ sense. Make another list of a few resources that are not.

3. How is the concept of efficiency related to the concept of scarcity? Consider, for example, your own use of time. When do you feel time to be more, and when less, scarce? Do you think about how to use your time differently during exam week, compared to when you are on vacation?

4. Suppose that society could produce the following combinations of pizzas and books:

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Pizzas</th>
<th>Books</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>50</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>40</td>
<td>10</td>
</tr>
<tr>
<td>C</td>
<td>30</td>
<td>18</td>
</tr>
<tr>
<td>D</td>
<td>20</td>
<td>24</td>
</tr>
<tr>
<td>E</td>
<td>10</td>
<td>28</td>
</tr>
<tr>
<td>F</td>
<td>0</td>
<td>30</td>
</tr>
</tbody>
</table>

a. Using graph paper (or a computer program), draw the production possibilities frontier (PPF) for pizza and books, being as exact and neat as possible. (Put books on the horizontal axis. Assume that the dots define a complete curve.)

b. Is it possible and/or efficient for this society to produce 25 pizzas and 25 books?

c. Is it possible and/or efficient for this society to produce 42 pizzas and 1 book?

d. If society is currently producing alternative B, then the opportunity cost of moving to alternative A (and getting 10 more pizzas) is _________ books.

e. Is the opportunity cost of producing pizzas higher or lower moving from alternative F to E than moving from alternative B to A? Why is this likely to be so?

f. Suppose that the technologies used in producing both pizzas and books improve. Draw one possible new production possibilities frontier in the graph above which represents the results of this change. Indicate the direction of the change that occurs with an arrow.
5. Match each concept in Column A with a definition or example in Column B.

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. a positive externality</td>
<td>i. an apple pie producer trusts that apple growers will supply the apples they promise to deliver</td>
</tr>
<tr>
<td>b. theoretical investigation</td>
<td>ii. the annual harvest of apples in a country from 1970-2000</td>
</tr>
<tr>
<td>c. time series data</td>
<td>iii. producing a combination along a production possibilities frontier</td>
</tr>
<tr>
<td>d. a public good</td>
<td>iv. apple growers will seek to maximize their profits</td>
</tr>
<tr>
<td>e. opportunity cost of buying an apple</td>
<td>v. you don’t get to have an orange</td>
</tr>
<tr>
<td>f. scarcity</td>
<td>vi. there is only one apple producer who is able to make very high profits</td>
</tr>
<tr>
<td>g. efficient production</td>
<td>vii. doesn’t take into account the passage of time</td>
</tr>
<tr>
<td>h. technological progress</td>
<td>viii. an orchard used to grow a full crop of apples cannot also be used to grow a full crop of pears</td>
</tr>
<tr>
<td>i. an institutional requirement of markets</td>
<td>ix. the apple tree you plant for your own enjoyment also pleases people passing by</td>
</tr>
<tr>
<td>j. market power</td>
<td>x. can expand a production possibilities frontier outward over time</td>
</tr>
<tr>
<td>k. a negative externality</td>
<td>xi. an inspection program for imported apples protects the nation’s orchards from a severe tree disease</td>
</tr>
<tr>
<td>l. an assumption of the basic neoclassical model</td>
<td>xii. Inspired by a falling apple, Isaac Newton proposes the existence of something called “gravity”</td>
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<tr>
<td>m. static analysis</td>
<td>xiii. the production of apple pie creates water pollution that harms downstream communities</td>
</tr>
</tbody>
</table>