

1

Introduction

This chapter introduces some basic concepts fundamental to the study of production economics and provides a brief review of fundamental terms used in economics. These terms are usually presented as part of an introductory economics or agricultural economics course, and provide a starting point for the further study of agricultural production economics. The fundamental assumptions of the purely competitive model and the relationship of these assumptions to agricultural production economics are outlined.

Key terms and definitions:

- Economics
- Wants
- Resources
- Theory
- Model
- Consumption Economics
- Production Economics
- Utility
- Profit
- Microeconomics
- Macroeconomics
- Statics
- Dynamics
- Agricultural Economics
- Pure Competition

1.1 Economics Defined

Economics is defined as the study of how limited resources can best be used to fulfill unlimited human wants. Whereas the wants or desires of human beings are unlimited, the means or resources available for meeting these wants or desires are not unlimited. Economics thus deals with making the best use of available resources in order to fulfill these unlimited wants.

An entire society, an entire country, or for that matter, the world, faces constraints and limitations in the availability of resources. When the word *resource* is used, people usually think of basic natural resources, such as oil and gas, and iron ore. However, the term has a much broader economic meaning, and economists include not only basic natural resources, but a broad array of other items that would not occur to those who have not studied economics.

An important resource is the amount of labor that is available within a society. The money that is invested in industrial plants used to produce items consumers want is another basic resource within a society. A resource can be defined still more broadly. Human beings vary in their skill at doing jobs. A society consisting primarily of highly educated and well-trained individuals will be a much more productive society than one in which most people have few skills. Thus the education and skills of jobholders within an economy must be viewed as a limiting resource.

Students may attend college because they hope to obtain skills that will allow them to earn higher incomes. They view the lack of a college degree to be a constraint or limitation on their ability to earn income. Underlying this is the basic driving force of unlimited human wants. Because human wants and desires are unlimited, whereas the resources useful in fulfilling these wants are limited, the basic problem that must be faced, both by individuals and by societies, is how best to go about utilizing scarce resources in attempting to fulfill these unlimited wants.

1.2 The Logic of Economic Theory

Economists and others have made numerous attempts to define the word *theory*. A definition widely accepted by economists is that a theory is a representation of a set of relationships. Economic theory can represent either the set of relationships governing the behavior of individual producers and consumers, or the set of relationships governing the overall economy of the society or nation.

However, some scientists, including economists, also use the term *theory* as a synonym for a hypothesis, a proposition about how something operates. Some theories may be based on little if any observation. An example is a theory of how the universe was formed. Theories in physics often precede actual observation. Physicists have highly developed theories about how electrons, protons, and neutrons in atoms behave, despite the lack of actual observation. Although theories may be used as a basis for explaining phenomena in the real world, they need not be based on actual observation.

An *economic theory* can be defined as a representation of a set of relationships that govern human behavior within some portion of an economy. An economic theory can also be defined as a hypothesis or set of hypotheses about how a particular aspect of an economy operates. These hypotheses might be tested by observing if they are consistent with the observed behavior within the economy. Theory as such is not tested; rather, what is tested is the applicability of a theory for explaining the behavior of a particular individual or group of

individuals. The conclusion by a social scientist that a theory does not adequately explain the behavior of a particular group of people does not render the theory itself invalid. The same theory might be quite applicable to other people under a slightly different set of circumstances.

1.3 Economic Theory as Abstraction

The real world is highly complex. Economists spend very little time in the real world, but rather, spend a lot of time attempting to uncover fundamental theories that govern human behavior as it relates to production and consumption. If the real world is highly complex, so also is the economy of any industrialized society, or for that matter, the economy of nearly any society or nation. There is so much complexity that it is often difficult to see clearly the fundamental relationships.

In an effort to see more clearly the relationships that are important, economists abstract from reality in developing theories. They leave out relationships identified as un-important to the problem, in an effort to focus more closely on the relationships which they feel are important. Economic theory often becomes a simplification of reality that may seem unrealistic or even silly to someone with no training in economics.

Moreover, economists appear to argue continually. To a person without a background in economics, economists never seem to agree on anything. The development of an economic theory as a formal set of relationships governing some aspect of an economy will invariably involve simplification. Some relationships will be included; others will be left out. The relationships included are those that the economist developing the theory felt were important and which represented the key features of the particular economic problem the economist wanted to study.

However, economists can and do engage in heated debate with regard to whether or not a particular theory (one that includes some relationships but omits others) is the correct representation. Debate is a very normal and ordinary part of the behavior of economists and is the driving force that results in a continual improvement in economic theories over time. Without it, economics as a discipline within the social sciences would not progress.

1.4 Economic Theory Versus Economic Model

Economists sometimes use the terms *theory* and *model* interchangeably. A child might think of a model as a miniature or toy version of, say, an automobile or farm tractor. This is not a bad way to think about an economic model. To be realistic, a model must have a degree of detail. The model must contain a representation of the principal parts of the real thing, or it would not be recognizable.

At the same time, the model would not be expected to perform the same functions as the real thing. Just as one would not expect to make a journey in a toy automobile, an economist would not expect to control the workings of the U.S. economy with a model of the economy. However, just as an automobile designer might construct a model of a new automobile before the real thing is built in an effort to obtain a better understanding of how the real thing might look, so might an economist construct a model of the U.S. economy to better understand how a particular government policy, if implemented, might affect individuals and firms within the economy.

Economists use models as a way to measure or simulate the effects of a policy without actually having to implement the policy. The key question is "What would happen if . . . ?" The model can be used to answer the question and to assess the impact of numerous

alternative policies without actually implementing them. Hence a model can also be thought of as a set of relationships (or theory) that lends itself to answering "what would happen if" types of questions.

1.5 Representing Economic Relationships

Economic theories and models can be represented in a variety of ways. Beginning in the 18th century with Adam Smith's famous work *The Wealth of Nations*, economists have relied heavily on words to express economic relationships. Increasingly, words did not lend themselves very well to answering specific "what if" types of questions. Economists in the late nineteenth and early twentieth centuries relied increasingly on graphical tools as the major means of expressing economic relationships. Graphics could often be used to make complex verbal arguments precise, but graphical tools had disadvantages as well. For example, a graph representing a production function on a farm was limited to no more than two inputs and a single output, since it is not possible to draw in more than three dimensions.

The use of mathematics as the means of describing economic theories and models got an important boost with the publication of Paul Samuelson's *Foundations of Economic Analysis* in 1947. Since that time, mathematics has become increasingly important as a tool for the development of theory and models. Fuzzy relationships cannot be part of a theory posed in mathematical terms. Moreover, mathematics opened new doors for expressing complicated relationships. On the production side, there were no longer any limits as to the number of inputs that a production function might use or the number of outputs that could be obtained.

Concomitant with the increased use of mathematics for describing economic relationships was increased use of statistics for estimating economic relationships from real world data. An entirely new subdiscipline, econometrics—economic measurement—appeared. The relationships contained within the mathematically based theoretical model could now be measured.

The final event having an impact on economics over the second half of the twentieth century was the rapid growth in the use of the computer as a device for estimating or measuring relationships within an economy. Economists now routinely use techniques for estimating models in which the computational requirements would have been considered impossible to achieve only five or ten years ago.

1.6 Consumption Versus Production Economics

Economics involves choices. A person who faces a limited income (and no one does not) must choose to purchase those items that make him or her feel most satisfied, subject to an income limitation or constraint. Choice is the heart of consumption economics. Economists say that a person derives utility from an item from which he or she receives satisfaction. The basic consumer economics problem involves the maximization of utility (satisfaction) subject to the constraint imposed by the availability of income.

This book deals with another set of choices, however, the set of choices faced by the producer of goods and services desired by the consumer. The producer also attempts to maximize utility. To maximize utility, the producer is motivated by a desire to make money, again in order better to fulfill unlimited wants. Although the producer may have other goals, the producer frequently attempts to maximize profit as a means of achieving utility or satisfaction. Profit is the difference between the revenues obtained from what is sold and the costs incurred in producing the goods. However, producers face constraints, too. If producers did not face constraints, the solution to the profit-maximization problem for the

producer would be to produce as much as possible of anything that could be sold for more than the cost of production.

Producers may attempt to maximize something other than profit as a means for achieving the greatest utility or satisfaction. Some farmers might indeed have the objective of maximizing profits on their farms given resources such as land, labor, and farm machinery. The underlying motivation for maximizing profits on the farm is that some of these profits will be used as income to purchase goods and services for which the farmer (and his or her family) obtain satisfaction or utility. Such a farmer behaves no differently from any other consumer. Other farmers might attempt to maximize something else, such as the amount of land owned, as a means to achieve satisfaction.

The producer faces an allocation problem analogous to that faced by the consumer. The consumer frequently is interested in allocating income such that utility or satisfaction is maximized. The producer frequently is interested in allocating resources such that profits are maximized. Economics is concerned with the basic choices that must be made to achieve these objectives. Consumption economics deals primarily with the utility maximization problem, whereas production economics is concerned primarily with the profit maximization problem. However, profits are used by the owner of the firm to purchase goods and services that provide utility or satisfaction.

1.7 Microeconomics versus Macroeconomics

Economics can be broadly divided into two categories: *microeconomics* and *macroeconomics*. Microeconomics is concerned with the behavior of individual decision-making units. The prefix *micro-* is often used in conjunction with things that are small. Microeconomics deals with the behavior of the individual consumer as income is allocated and the individual firm manager (such as a farmer) who attempts to allocate his or her resources consistent with his or her goals.

The prefix *macro-* is often used in conjunction with things that are large. *Macroeconomics* deals with the big picture. For example, a person studying macroeconomics might deal with issues confronting an entire economy. Inflation and unemployment are classical areas of concern for macroeconomists. They are concerned with how producers and consumers interact in total in a society, nation, or for that matter, the world.

Macroeconomists are also concerned with the role that government policy might play in determining answers to the fundamental questions that must be answered by any society. These questions include (1) What should be produced? (2) How much should be produced? (3) How should available goods and services be allocated?

Although microeconomics and macroeconomics are often considered to be separate branches of economics, they are really very closely intertwined. The macroeconomy is made up of individual producers and consumers. Moreover, the decisions made by individual producers and consumers are not at all independent of what is happening at the macro level. Tax cuts and tax increases by the federal government influence income available to the individual consumer to spend. Prices received by individual farmers for the commodities they produce are in large measure determined by the aggregate production of all farmers in producing a particular commodity, yet to a great extent affect decisions made by the farmer as an individual firm manager.

This text deals with production economics and the central focus is on the farm firm as an individual decision-making unit. At the same time, the individual farm firm does not operate in a vacuum, but is affected in large measure by what happens in the aggregate.

Moreover, decisions made by individual firms such as farms, when taken together, can have a substantial impact in a macroeconomic setting.

1.8 Statics Versus Dynamics

Economics can also be classified as static economics or dynamic economics. *Static economics* can be thought of as one or more still snapshots of events taking place in an economy. *Dynamic economics* can be thought of as a moving picture of the economy. Economists rely heavily on what is sometimes called *comparative statics*.

The economic relationships are often represented by a graph: for example, a graph showing a supply curve and a demand curve. An event or shock affecting demand or supply is assumed to take place. For example, suppose that consumer incomes increase. A second demand curve might be drawn on the same graph to represent what happens as a result. The snapshot comparison of prices and quantities that would prevail under the old and new levels of consumer incomes is referred to as *comparative statics* (Figure 1.1).

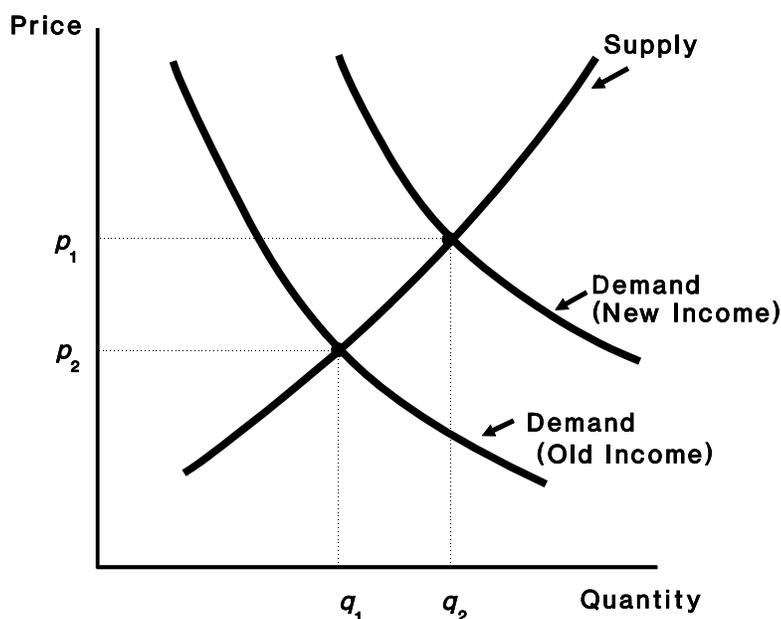


Figure 1.1 Supply and Demand

With an analysis using comparative statics, no attempt is made to uncover the processes that caused incomes to rise, nor is time important. This is sometimes referred to as a static, timeless environment. It is a useful means of analysis when the focus is on the impact of an economic shock, not the processes by which the shock takes place. Notice also that comparative statics can be used to shed light on either microeconomic or macroeconomic issues.

In contrast with statics, time is the important element of dynamics. Dynamic economics attempts to show the processes by which an individual consumer, firm, or economy moves from one equilibrium to another. Suppose, for example, that the price of a good or commodity decreases. Dynamic economics might attempt to uncover changes in the quantity that would be taken from the market one hour, one day, one week, and one month from the point in time