General Equilibrium and the Efficiency of Perfect Competition

12

CHAPTER OUTLINE

Our discussion has revolved around the two fundamental decision-making units, *households* and *firms*, which interact in two basic market arenas, *input markets* and *output markets*.

Output and input markets are connected because firms and households make simultaneous choices in both arenas.

Buying more *capital*, for instance, usually changes the marginal revenue product of *labor* and shifts the labor demand curve.

Input and output markets cannot be considered as if they were separate entities or as if they operated independently. Although it is important to understand the decisions of individual firms and households and the functioning of individual markets, we now need to add it all up so we can look at the operation of the system as a whole.

When an economic system produces what people want and does so at the least possible cost, the economy has achieved:

a. Equity.
b. Efficiency.
c. Growth.
d. Stability.

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partial equilibrium analysis The process of examining the equilibrium conditions in individual markets and for households and firms separately.

general equilibrium The condition that exists when all markets in an economy are in simultaneous equilibrium.

In talking about general equilibrium, we continue our exercise in *positive economics*. Later in the chapter, we turn to *normative economics* as we begin to judge the economic system. In judging the performance of any economic system, we use two criteria: *efficiency* and *equity* (fairness).

efficiency The condition in which the economy is producing what people want at least possible cost.

Market Adjustment to Changes in Demand

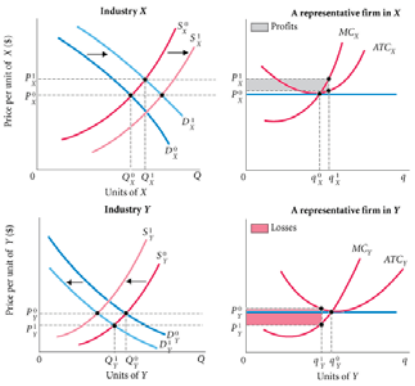

FIGURE 12.1 Adjustment in an Economy with Two Sectors

Initially, demand for X shifts from D^0_X to D^1_X.
This shift pushes the price of X up to P^1_X, creating profits.
Demand for Y shifts down from D^0_Y to D^1_Y, pushing the price of Y down to P^1_Y and creating losses.
Firms have an incentive to leave sector Y and an incentive to enter sector X.
Exiting sector Y shifts supply in that industry to S^1_Y, raising price and eliminating losses.
Entry shifts supply in X to S^1_X, thus reducing and eliminating profits.

The effects of technological changes on costs, firm entry, and market price in a given industry can be considered:

a. A general equilibrium analysis.
b. A partial equilibrium analysis.
c. A macroeconomic analysis.
d. A total equilibrium analysis.

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ECONOMICS IN PRACTICE

More Corn to Burn, Less to Eat

Over the years, the government has used several mechanisms to encourage the use of corn-based ethanol.

Until January 2012, refiners were given a subsidy of $0.45 for every gallon of ethanol they blended into their fuel. Refiners also face mandates requiring them to blend some corn-based ethanol into their fuel.

The program is not only expensive, but the general equilibrium effects of the corn mandates have also caused some to doubt the wisdom of pushing ethanol.

When corn is moved into fuel, the price of corn for food rises. For many people throughout the world, small food price increases carry big costs.

There is considerable debate around this topic, and clearly good answers require system-wide thinking.

THINKING PRACTICALLY

1. Use general equilibrium supply and demand analysis to show the impact of requiring more corn ethanol on the market for food. Treat corn as good X and all other foods as Y.

Allocative Efficiency and Competitive Equilibrium

Pareto Efficiency

Pareto efficiency *or* Pareto optimality A condition in which no change is possible that will make some members of society better off without making some other members of society worse off.

For a definition of efficiency to have practical meaning, we must answer two questions: (1) What do we mean by "better off"? and (2) How do we account for changes that make some people better off and others worse off?

Example: Budget Cuts in Massachusetts

Several years ago, in an effort to reduce state spending, the budget of the Massachusetts Registry of Motor Vehicles was cut substantially by reducing the number of clerks in each office.

Estimates showed that taxpayers in Massachusetts saved about $80,000 per year by having fewer clerks at that office.

A change in the allocation of resources is said to be (potentially) efficient when it can be demonstrated that:

a. The value of the gains exceeds the value of the losses associated with the change.
b. The value of the gains just equals the value of the losses.
c. The value of the gains is less than the value of the losses.
d. There are no gains or losses associated with the change.
e. There are only gains associated with the change.

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Revisiting Consumer and Producer Surplus

Consumer surplus is defined as the difference between the maximum amount that buyers are willing to pay for a good and its current market price.

Producer surplus is defined as the difference between the current market price of a good and the full cost of producing it. In a way it is a measure of profitability.

A perfectly competitive economy is economically efficient and will lead to a Pareto efficient set of outcomes.

The Efficiency of Perfect Competition

All societies answer these basic questions in the design of their economic systems:

1. *What gets produced?* What determines the final mix of output?
2. *How is it produced?* How do capital, labor, and land get divided up among firms? In other words, what is the allocation of resources among producers?
3. *Who gets what is produced?* What determines which households get how much? What is the distribution of output among consuming households?

Under perfect competition:

(1) Resources are allocated among firms efficiently.

(2) Final products are distributed among households efficiently.

(3) The system produces the things that people want.

Efficient Allocation of Resources Among Firms

The assumptions that factor markets are competitive and open, that all firms pay the same prices for inputs, and that all firms maximize profits lead to the conclusion that the allocation of resources among firms is efficient.

You should now have a greater appreciation for the power of the price mechanism in a market economy.

Each individual firm needs only to make decisions about which inputs to use by looking at its own labor, capital, and land productivity relative to their prices.

But because all firms face identical input prices, the market economy achieves efficient input use among firms.

Prices are the instrument of Adam Smith's "invisible hand," allowing for efficiency without explicit coordination or planning.

Efficient Distribution of Outputs Among Households

We all know that people have different tastes and preferences and that they will buy very different things in very different combinations. As long as everyone shops freely in the same markets, no redistribution of final outputs among people will make them better off. If you and I buy in the same markets and pay the same prices and I buy what I want and you buy what you want, we cannot possibly end up with the wrong combination of things. Free and open markets are essential to this result.

An efficient economic system is a system in which:

a. Households have perfect information on product quality and on all prices available.
b. Firms have perfect knowledge of technologies and input prices.
c. There are both internal and external costs.
d. Firms produce the right type and amount of output, or the output that people want most, at the least possible cost.
e. All of the above.

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Producing What People Want: The Efficient Mix of Output

The condition that ensures that the right things are produced is

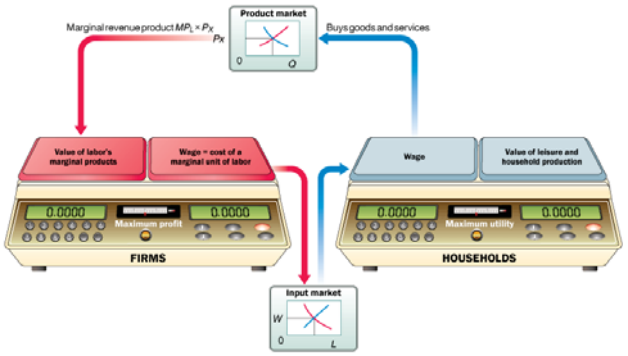
$P = MC$.

If $P_X > MC_X$, society gains value by producing *more X*.
If $P_X < MC_X$, society gains value by producing *less X*.

▲ FIGURE 12.2 **The Key Efficiency Condition: Price Equals Marginal Cost**

Society will produce the efficient mix of output if all firms equate price and marginal cost.

Producing What People Want: The Efficient Mix of Output



▲ FIGURE 12.3 **Efficiency in Perfect Competition Follows from a Weighing of Values by Both Households and Firms**

Which of the following conditions exist when a perfectly competitive system leads to an efficient allocation of resources?

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Perfect Competition versus Real Markets

We have built a model of a perfectly competitive market system that produces an efficient allocation of resources, an efficient mix of output, and an efficient distribution of output.

The perfectly competitive model is built on a set of assumptions, all of which must hold for our conclusions to be fully valid.

We have assumed that all firms and households are price-takers in input and output markets, that firms and households have perfect information, and that all firms maximize profits.

These assumptions do not always hold in real-world markets. When this is the case, the conclusion breaks down that free, unregulated markets will produce an efficient outcome.

The Sources of Market Failure

market failure Occurs when resources are misallocated, or allocated inefficiently. The result is waste or lost value.

There are four important sources of market failure:

(1) *Imperfect market structure*, or noncompetitive behavior.

(2) The existence of *public goods*.

(3) The presence of *external costs and benefits*.

(4) *Imperfect information*.

Imperfect Markets

In imperfectly competitive markets, with fewer firms competing and limited entry by new firms, prices will not necessarily equal marginal costs.

As a consequence, in a market with firms that have some market power, where firms do not behave as price-takers, we are not guaranteed an efficient mix of output.

Public Goods

public goods, *or* social goods Goods and services that bestow collective benefits on members of society. Generally, no one can be excluded from enjoying their benefits. The classic example is national defense.

Which of the following should we expect in a completely laissez-faire market system?

a. We can expect private producers to produce all the goods and services that society wants, thus there would be no need for public goods.
b. The private and public sectors would cooperate with each other to provide the goods that society wants most.
c. All the goods that society wants would be public goods, thus there would be no need for a private sector.
d. The private market would not produce some of the goods people want, thus we would have to rely on the government to produce some goods.

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Externalities

externality A cost or benefit imposed or bestowed on an individual or a group that is outside, or external to, the transaction.

Imperfect Information

imperfect information The absence of full knowledge concerning product characteristics, available prices, and so on.

Evaluating the Market Mechanism

Freely functioning markets in the real world do not always produce an efficient allocation of resources, and this result provides a potential role for government in the economy.

However, many believe that government involvement in the economy creates more inefficiency than it cures.

In addition to the criterion of efficiency, economic systems and policies must be judged by many other criteria, not the least of which is *equity*, or fairness.

Indeed, some contend that the outcome of any free market is ultimately unfair.

REVIEW TERMS AND CONCEPTS

efficiency

externality

general equilibrium

imperfect information

market failure

Pareto efficiency *or* Pareto optimality

partial equilibrium analysis

public goods *or* social goods

Key efficiency condition in perfect competition:

$$P_X = MC_X$$