How to Study for Chapter 9: The Invisible Hand

Chapter 9 summarizes the earlier chapters by explaining the basic philosophy that has supported market economies, such as the one existing in the United States.

1. Begin by looking over the Objectives listed below. This will tell you the main points you should be looking for as you read the chapter.
2. New words or definitions are highlighted in italics and in red color. Other key points are highlighted in bold type and in blue color. Answer the questions in the text as they are asked. Then, check your answer by reading further in the text.
3. You have more examples of the demand-supply graph in this chapter.
4. You will be given an In Class Assignment and a Homework assignment to illustrate the main concepts of this chapter. When you have finished the text, the Test Your Understanding questions, and the assignments, go back to the Objectives below. See if you can answer the questions without looking back at the text. If not, go back and re-read that part of the text. Then, try the Practice Quiz at the end of the chapter.

Objectives for Chapter 9: The Invisible Hand

At the end of Chapter 9, you will be able to:

1. Explain what is meant by **"consumer sovereignty"**.
2. Explain what is meant by the **"invisible hand"**.
3. Analyze the results of a change in tastes on the part of consumers.
4. Analyze the results of a change in the relative scarcities of the factors of production.
5. Explain the **two functions of the price** in a market system.
6. Explain how the self-interest of the sellers leads to behaviors in society's (consumers') interest.
7. Explain the ways by which a market economy can be considered analogous to an ecosystem.
8. Explain how the ideas of markets have been applied to environmental regulation.
9. What criticisms can be made of command and control regulation? What advantages might there be to market incentives in environmental regulation?

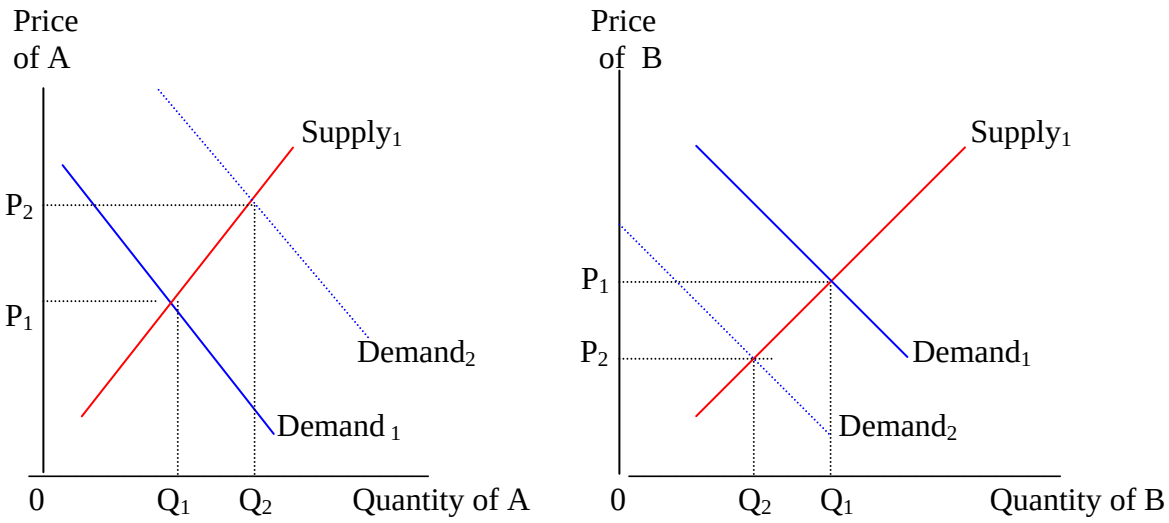
Chapter 9 The Invisible Hand (latest revision June 2004)

Thus far in the course, we have been discussing the way markets operate. In the United States, the questions of what to produce, how to produce, and for whom to produce are answered mainly through the operation of markets. The basic justification for this market system was first argued by the Scottish philosopher, **Adam Smith**, in 1776. There are several parts to Smith's justification. We shall consider one major part here.

We want an economy to work as well as possible for society. But when we say "society", exactly whom do we mean? In the days of Adam Smith, the prevailing view was called **mercantilism**. In this view, the goal of an economy was to earn gold and silver for the king. The monarch would then use the gold and silver to pay for a large military for defense and conquest. To Smith, this was wrong. The goal of an economy, he argued, was to serve consumers. **"The consumer is the king."** This has been called ***"consumer sovereignty"***.

(1) A Change in Consumers' Tastes

To illustrate Smith's argument, assume there are two products: A and B. The consumer (the king) has a change in tastes; **consumers now prefer A more and B less**. Let us start with A. The demand for A increases (shifts right).



There is now a shortage of A. Recognizing this, sellers of A will raise the price of A from P_1 to P_2. ***The price has two main functions in a market economy: first, it provides information telling people what to do. Second, it provides incentives for them to act on this information.*** The increase in the price tells sellers all they need to know; they do not need any fancy market research. The increase in the price tells sellers of A to produce more of A because buyers want more of A. It also provides the incentive to do just that. Sellers are self-interested. Their goal is the maximization of their profits. **They produce more of A (from Q_1 to Q_2) because doing so increases their profits**. Sellers probably do not know why the price increased. And they do not need to know this. Sellers certainly do not care that they made buyers happy by producing A. ***But, by acting in their own self-interest, they have also acted in the social (consumers') interest.***

Now, let us look at sellers of B. The demand for B has fallen (shifted left). There is now a surplus of B. Recognizing this, sellers will be forced to lower the price of B from P_1 to P_2. The decrease in the price of B provides all the **information** these sellers need; it tells them that buyers do not desire as much B. It also provides an **incentive** to produce less B. Producing less B (from Q_1 to Q_2) provides sellers of B with the highest possible profit under the new condition of reduced demand for B.

What about the workers? A major goal of workers is to maximize wages. As the production of A increases, producers of A will need to hire more workers. To attract them, the wages paid to workers producing A rise. As the production of B decreases, the producers of B will either hire fewer workers or will reduce the wages of their workers. Those facing lower wages or loss of jobs in B will find the higher wages in A attractive. **Workers will move to produce those**

goods and services that consumers desire most. As just one example: nature was "cruel" and located a large amount of oil in Alaska. Consumers desire oil greatly, but Alaska is not a desirable location for most workers. How did oil companies get workers to go to Alaska to produce oil? The answer, of course, was that they raised the wages substantially. A person working maximum overtime could earn perhaps $75,000 or more in six months in Alaska.

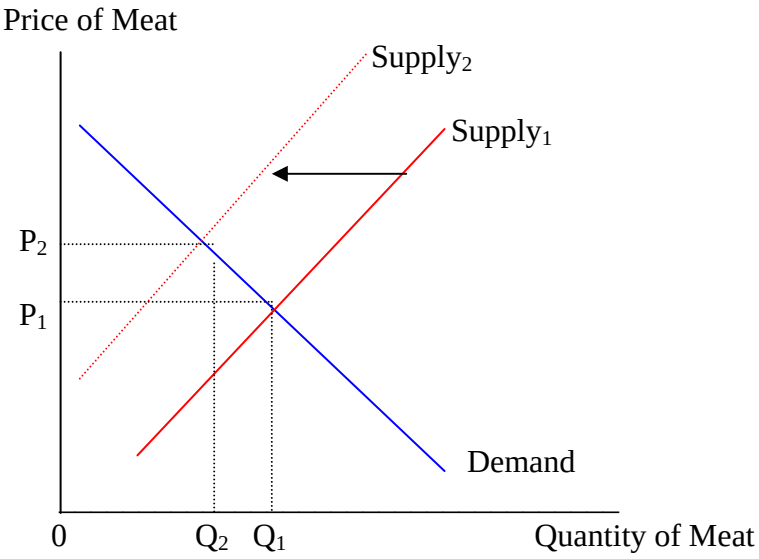
Both companies and workers are guided, as if by an invisible hand, to produce the goods and services that are most desired by consumers. And this occurs when all of them were only pursuing their own self-interest. To quote Adam Smith, "He...neither intends to promote the publick (sic) interest, nor knows how much he is promoting it...he intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention."

Imagine that sellers of B and their workers refuse to follow the information and incentives provided by the falling price of B. They truly love what they are doing and do not wish to change. They would produce a certain amount (Q_1) of B. Some of the B that they produce will not sell. Their profit is less than if they had reduced production to Q_2. The reduced profit will eventually force them out of business. ***Producers and workers must follow the wishes of consumers, even if they hate it, or perish.***

Assume that sellers actually cared about consumers and wanted to make consumers happy. How would they know what to do? Imagine the time and cost to get all the information they would need to know. More than likely, they would still not produce the right goods or services. ***Yet, in trying to maximize their own profits or wages, people are guided to produce the right goods and services. They may not even know that they are doing so.*** To quote Adam Smith again, "by pursuing his own self-interest he frequently promotes that of society more effectively than when he really intends to promote it."

(2) A Change in the Relative Scarcity of Resources

Let us take a different example. In 1973, there was a mysterious disappearance of the anchovy catch off the Peruvian coast. The supply of anchovies was significantly reduced. This hardly seems like the most important news; in fact, very few people even knew of it. In the United States, anchovies are mainly used in the production of animal feed. When the supply of anchovies was reduced, producers of animal feed had to turn to other sources of protein (mainly wheat). These other sources were more expensive. This increase in cost caused an increase in the price of animal feed. When the price of animal feed rose, the costs of production rose for those companies producing beef and pig products. The rising costs of production caused the supply of meat products to shift left. The result is that the price of meat products rose from P_1 to P_2 on the graph on the next page.



Consumers were totally unaware of the disappearance of the anchovies. But when they went to market, they noticed that the prices of hamburger, steak, ham, and bacon had all risen. Faced with these higher prices, they ate more chicken, fish, and cheese. ***They were guided, as if by an invisible hand, to economize on that which had become scarce.*** Again, the rising price provided all the **information** consumers needed to know. And it provided the **incentive** for them to buy fewer products that were produced with anchovies and more products that were not. ***The market not only guides producers to produce those products consumers desire most, it also guides consumers to buy less of those products that use resources that have become relatively scarce***. (As another example, when oil became relatively scarce, it was important that consumers use less of it. This was accomplished very well once the price of gasoline rose to more than $2.00.)

To summarize: the "invisible hand" is the market. The most important variable in the market is the price. The price has two functions: it provides information to both buyers and sellers and it provides incentives to act on that information. People act in the own self-interest. Buyers act to maximize the satisfaction they get from the products they buy, given the limitations of their incomes. Sellers act to maximize profits. Workers act to maximize the wages they receive. In pursuing their own self-interest, sellers and workers ultimately do that which is best for society as a whole (that is, consumers), even though doing so is not their intent and even though they may not know they are doing so. This is the magic of the market.

Eco-nomics

In many ways, a market economy is similar to an ecosystem. Indeed, both words are derived from the same Greek word ("Oikos"). In ecology, the basic unit is the species. In

economics, the basic unit is the individual. In ecology, each species pursues only its own **self-interest**, assumed to be survival. In economics, individuals pursue only their own self-interest, assumed to be the maximization of individual well being. In both an ecosystem and an economy, there is **intense competition** and a means of measuring success in the competition: reproductive success in the environment and profit or consumer well being in the economy. In both, there is the importance of the **"niche"**; species must find a niche to be able to survive in the environment and businesses or workers must find a niche to be able to survive in the economy. **In both an ecosystem and an economy, the basic units are guided by a sort of "invisible hand" to do what is right for all.** The bee does not pollinate the flowers because it cares about the flowers. Yet, the flowers would not exist without the actions of the bees. Similarly, the company does not produce what it does because it cares about consumers. The worker does not work where he or she works because it is good for consumers. In each case, the pursuit is self-interest. However, individuals are guided to do what is best for the society by this "invisible hand". Both ecosystems and economies are subject to **disturbances**. In ecosystems, these may involve fire, wind, earthquakes, and so forth. In economies, they may involve new technologies, new institutions, changes in the relative scarcity of natural resources, etc. (those factors that would shift demand or supply). In both, great importance attaches to the **ability to adapt**. Disturbances generate new niches and eliminate old one; those that can adapt will survive while those that cannot adapt will die. For example, when oil became very scarce in the early 1970s, it created a new niche --- high gas mileage cars --- and eliminated an old niche ---large, gas-guzzling cars. Those companies that could adapt survived; some even prospered. Companies like Chrysler that could not adapt would have become extinct but for a bailout by the government. Thus, **the economy, like the ecosystem, evolves over time**. Finally, neither ecosystems nor market economies are centrally controlled or planned. Indeed, people understand each so poorly that **any attempt to control or plan either typically leads to bad outcomes**.

Test Your Understanding

1. Assume there are two products: large, gas-guzzling cars and small, fuel-efficient cars. Show the demand and supply curves for each on the graphs as well as the equilibrium price and quantity. Then, the price of gasoline doubles as a result of a reduction in the production of oil. Show the changes on the two graphs as well as the new equilibrium. When oil becomes scarce, it is desired that people will conserve on oil and oil products. Based on your graphs, does the market lead people to do so? WHY or WHY NOT?
2. Some people advocate a plan for educational vouchers. In its extreme form, this plan would give to the parents of each child in California a voucher for the money currently spent on schooling (about $4,500 per child). The parents could then use that voucher to buy schooling for the child at any school in California. In some plans, the parents could pay more than the amount of the voucher if they desire. The voucher could not be used for any purpose other than school. This would replace the current system in which the money goes to the school and, with few exceptions, each child goes to the school in the neighborhood. Thus, in effect, schools would become private businesses who would compete for students in a market. Use the principles of the “invisible hand” and the benefits of a market to argue **in favor of** replacing the current system with educational vouchers. Then, argue **against** the replacement of the current system with education vouchers by naming some of the problems that a system of education vouchers might cause. In your answer, consider whether education is just another commodity, similar to food and clothing. You might wish to find arguments for and against educational vouchers. To do this, go to www.google.com and type in Educational Vouchers.
3. There have been many efforts to stop Wal-Mart from building new stores. One succeeded in 2004 in San Marcos. One complaint is that Wal-Mart would ruin many of the local businesses. As those would

businesses fail, their owners and workers would reduce buying at the other businesses, such as barbers or gasoline stations. The whole community of the small town will be lost. People will have to move. Because people would have less income, they would pay less taxes, reducing the money available for schools, roads, police, and so forth. Also, because the Wal-Mart stores are large, they cause traffic congestion. And there are charges that Wal-Mart exploits very cheap workers. First, write a brief response justifying the coming of the Wal-Mart. Then, write a counter argument that Wal-Mart should not be allowed to have its store in the small town.

Case: Environmental Regulations

We know that many activities that people undertake cause harm to the environment. As will be argued in Chapter 10, preventing people from harming the environment is one of the functions government should fulfill in a market economy. In this section, let us focus mainly on the harm to the environment that results from **air pollution**. Government needs to concern itself first with the question of how much air pollution to allow and how much to prevent. As was shown in Chapter 2, it may not be desirable to eliminate all air pollution. ***Policies should be undertaken to reduce air pollution only as long as the marginal benefit of doing so exceeds the marginal opportunity cost.*** (Review the argument in Chapter 2)

But once it has been decided how much air pollution to eliminate, there is another important question that government agencies must answer: **how should the air pollution be reduced**? In most cases, air pollution has been reduced through laws that make certain polluting activities illegal. This is known as ***"command and control regulation"***. You are familiar with one example of this type of regulation --- the requirement that all cars licensed in California have a smog control device that works. Command and control regulation has been criticized by many economists. ***First, they argue that the environmental laws are enforced by government bureaucracies***. As we shall see in Chapter 11, bureaucracies have their own goals and can often be very inefficient. ***Second, they argue that government regulations are not the least costly means to achieve the goals the government desires***. There is too much paperwork involved. Companies spend too much money on lobbyists. And the regulators are likely to make serious mistakes, especially as they must rely on people from the industries involved for the information they need to make their decisions. ***Third, consistent with the second point, they argue that the government requires all polluters to reduce their pollutants equally***. ***The government does not distinguish between those companies who can reduce pollutants easily (i.e., at low cost) and those who cannot***. Studies show that command and control regulations are at least 4 to 6 times more expensive than other methods. ***And fourth, they argue that government regulations create a hostile, adversarial relationship between the industries involved and the government***. Instead of trying to reduce their pollution, companies devote their energies to trying to avoid the regulations. Because of these objections to government regulations, these economists have recommended the use of market solutions. At their insistence, market solutions have come to be used more and more. Let us consider a few examples of these market solutions.

One important example of the use of markets to reduce air pollution has occurred in the greater Los Angeles area. This area has long been noted for excessive air pollution. The local government is required by the Clean Air Act of 1990 to reduce air pollution emissions. The use of market solutions in greater Los Angeles has so far focused exclusively on industrial polluters. Under a program of the South Coast Air Quality Management District, companies in the greater Los Angeles area are given ***"rights to pollute"***. This means that they are allowed to dump a

certain amount of emissions into the air --- and no more. Some companies can meet, and even exceed, these limits easily. Other companies have a very difficult time meeting these limits. **Those companies who cannot meet the limits have the right to buy the "rights to pollute" from the other companies**. The price is determined by the demand for and supply of these rights. There are companies, such as AER*X, who specialize in dealing in rights to pollute. Let us illustrate the way such a market would work. Suppose that Company X has the right to dump 50 tons of pollutants per year into the air. And suppose that it could install a new production process that would reduce its emissions by 10 tons at an added cost of $20,000 per year. Under command and control regulation, Company X would have no incentive to reduce its emissions below 50 tons. But under the market approach, it does. Suppose that rights to pollute sell for $5,000 per ton. Company X could spend the $20,000 to reduce its pollutants by 10 tons, and then sell the rights to those 10 tons to Company Y for $50,000 ($5,000 times 10 tons), pocketing the difference of $30,000. ***Company X now has a financial incentive to reduce its air pollution as much as it can --- even below the level required by the government***. Company Y also has the same financial incentive. If Company Y cannot find a way to reduce its pollutants, it is required to pay an extra $50,000. This adds to its costs of production. Since Company Y is now a high cost producer in comparison to its competitors, it may be faced with the prospect of financial losses. ***The market forces Company Y either to find a way to reduce its pollution or, eventually, to go out of business***. In a market, those who are inefficient (in this case in reducing pollution) die out. So the market solution gives both companies the proper incentives. ***It also generates the result that most of the reduction in air pollution is accomplished by the companies who can do it most cheaply. And it gives companies the incentives to actually reduce pollutants more than required.*** As companies discover ways to produce with less pollution, the government can reduce the total amount of "rights to pollute". ***(A reduced supply of "rights to produce" would raise the price. This would create an even greater incentive to find ways to reduce pollutants.)*** Studies shows that this trading program has saved billions of dollars, despite the fact that only a small number of the possible trades have actually taken place. Nitrous oxide emissions have been reduced 35% and sulfur dioxide emissions have been reduced 25%. The air quality in the greater Los Angeles area is better than it once was. But the program of trading "rights to pollute" can take only a small amount of the credit because it is limited to industrial polluters. Most of the air pollution in the Los Angeles area is generated by automobiles. There have been proposals to have one's automobile license fee depend on the amount of air pollution emitted. To date, this has not been put into effect.

Market solutions have also been tried to solve the problem of **acid rain**. Power plants generate most of the acid rain. Acid rain is formed when sulfur dioxide, released when coal is burned, and nitrogen oxide, released from burning any fossil fuel, are transformed into sulfuric and nitric acids. With very high smokestacks in these power plants, the acids are transmitted hundreds of miles by the wind, returning to earth attached to raindrops. Acid rain has created large amounts of acid in some lakes and streams. It has harmed forests, reduced agricultural productivity, eroded building and bridges, and even contributed to human illness. The areas that are most harmed by acid rain are New York, New England, and Canada. For years, little was done about this problem. The main command and control attempt at a solution was to require power plants to shift from high-sulfur coal to low-sulfur coal. This approach was never implemented because the people who would have been hurt (those with jobs related to high-sulfur coal in Pennsylvania, Indiana, Ohio, and Illinois) were able to prevent the shift to low-

sulfur coal. In 1990, the Clean Air Act required a reduction of 10 million tons of sulfur dioxide emissions and 2.5 million tons of nitrogen oxide emissions by the year 2010. Emissions of these two were then to be capped at the level reached in the year 2010. **Marketable permits were issued**, first to the largest coal-burning producers of electricity and then to other power companies throughout the United States. In this case, trading is national. **There is an organized market for the trading of these permits**. By 1996, the permits were selling for about $100 per ton. The fact that there are hundreds of companies trading these permits generates a better market than that found in the Los Angeles example. ***Early studies indicate that this market-based approach will allow companies to meet the goals stated in the Clean Air Act at a cost that will be 15% to as much as 25% less than the cost that would have resulted had traditional command and control regulation been used. And by 1997, the utilities had reduced their sulfur dioxide emissions 23% to 39% more than had been required in the law.***

There have been a few other examples of the use of markets to reduce environmental harm. For example, recently, the government desired to re-introduce the gray wolf to the area near Yellowstone National Park. Ranchers in the area commonly killed these wolves, fearing that the wolves posed a threat to their livestock. Government command-and-control regulation made such killing illegal. But the killing continued anyway. There was great hostility between the landowners and the government agencies. Then, an environmental group, Defenders of Wildlife, offered to pay landowners $5,000 if they could show that a litter of wolf pups had been reared on their property. This policy created a market incentive for the landowners to act in ways that improve the environment. It also reduces the hostility that is felt, as both landowners and environmentalists are now on the same side. At the time of this writing, it is too early to tell how successful this program has been. But some people are encouraged enough to propose similar market incentives to preserve other species.

Environmental problems have been major political issues in the United States. These problems will be discussed in various places throughout this book. As of now, command and control regulation is still the dominant way by which we deal with environmental problems. The use of markets to solve environmental problems is still in its infancy. Yet, the use of markets has the potential to solve environmental problems at a lower cost. It also has the potential to reduce much of the hostility that accompanies command-and-control solutions. Market solutions to environmental problems could become much more prevalent in the future.

Internet Assignments.

1. Go to the site of the South Coast Air Quality Management District at http://www.aqmd.gov. Read about the Market Incentives Program under Rules (Rule 20) at http://www.aqmd.gov/rules/html/tofc20.html. Describe the market incentives program as it exists today (this is the program described in the chapter). Provide more detail than the chapter does. Then, search the AQMD site for information as to the success or failure of the program.
2. Go to the EPA site at http://epa.epa.gov. Highly recommended. The Plain English Guide to the Clean Air Act. The Role of the Federal Government and the Role of the States.
   a. Are the states or the EPA primarily responsible for pollution control?
   b. Does the 1990 Act provide for **market based solutions** to air pollution problems? Give examples.

Practice Quiz for Chapter 9

1. The goal of a pure market economy is to best meet the desires of
   a. consumers b. companies c. workers d. the government

2. In a pure market economy, which of the following is a **function of the price**?
   I. provide information to sellers and buyers II. provide incentives to sellers and buyers
   a. I only b. II only c. both I and II d. neither I nor II

3. In a market system, sellers act in _____ interest , but this leads to behaviors in _____ interests.
   a. self; self b. self; society's c. society's; society's d. society's; self

4. In a market system, if buyers desire more of product A,
   a. more of Product A will be produced c. the price of Product A will fall
   b. less of Product A will be produced d. there will be a gray market for Product A

5. In a market system, if one factor of production becomes scarce,
   a. products that use much of that factor of production will have their prices rise
   b. buyers will buy less of products that use much of that factor of production
   c. buyers will buy more of products that use little of that factor of production
   d. all of the above

6. The requirement that you have a smog control device on your car is an example of
   a. command and control regulation b. a market based solution

7. Selling **"rights to pollute"** is an example of
   a. command and control regulation b. a market based solution

Answers 1. A 2. C 3. B 4. A 5. D 6. A 7. B