MyEconLab Chapter 12 Study Plan

CHAPTER CHECKPOINT

Study Plan Problems and Applications

1. Judy knows that her car is a lemon and offers it for sale. If the used-car market is working efficiently, will buyers know whether her car is a lemon? Why or why not?
2. Some car dealers offer used cars for sale with warranties and some offer them without warranties. Describe the equilibrium in the market for used cars. Is the market efficient?
3. **G.M. recalls 6,800 pickups for inaccurate shift-lever reading**

   General Motors is recalling 6,800 pickups from the 2011 model year because a defective clip could allow the automatic transmission's selector to appear to be in Park when it was not. A worker at the assembly plant discovered the problem.

   Source: *The New York Times*, July 1, 2011

   Did G.M. sell 6,800 lemons to people who bought the pickups? If G.M. did, what was the private information that it had that buyers did not know? If G.M. didn't, explain why not.

Use the following information to work Problems 4 and 5.

Mary is an 18-year-old student, who recently bought a used car. Mary is looking to buy car insurance. Insurance companies compete for her business.

4. Is there a moral hazard problem in a transaction between Mary and an insurance company? Explain why or why not.
5. Is there an adverse selection problem in a transaction between Mary and an insurance company? Explain why or why not.
6. If you have private information that you are a more aggressive driver than your driving record indicates, would you buy collision insurance? If the insurance company offers you a large deductible or a no-claim bonus are you likely to take the offer? Why or why not?

Use the following information to work Problems 7 to 9.

President Obama campaigned on a health-care reform plan that did not include mandatory health insurance. Hillary Clinton wanted mandatory health insurance with no opting out. In 2009, the President said he would support making health insurance mandatory with the cost covered by employers, but those who could not afford to pay and small businesses would be exempt.

7. If health insurance is optional, would healthy people be more likely or less likely to buy insurance?
8. What obstacles to efficiency does optional health insurance create?
9. U.S. health care per person costs twice that of other rich countries. Does the United States overprovide? Do other countries underprovide? What economic concepts do you need to answer? What data might be relevant?
10. If U.S. health care was delivered like basic education is, how would the health-care system compare to that in Canada? Would it be efficient?
11. Read *Eye on the Market For Used Cars* on p. 296 and then explain how a warranty signals that a car isn't a lemon and why it is in a used-car dealer's self-interest to offer a warranty.

CHAPTER SUMMARY

Key Points

1. **Describe the lemons problem and explain how the used-car market solves it.**
   - In some markets, one side of a market has private information—asymmetric information.
   - In the market for used cars, the seller knows and the buyer doesn't know if a car is a lemon.
   - Adverse selection results in a pooling equilibrium with too many lemons and too few good cars being traded.
   - Dealers' warranties act as signals and enable the market to achieve a separating equilibrium that is efficient.
2. **Describe the asymmetric information problems in the insurance market and explain how they are solved.**
   - In insurance markets, buyers are better informed than sellers about the risk being insured.
   - Without screening, too few low-risk people would be insured.
   - Moral hazard arises in insurance: An insured person has less incentive than an uninsured person to avoid the insured loss.
   - The no-claim bonus and deductible reveal risk and enable insurance markets to reach an efficient separating equilibrium.
3. **Explain the information problems and other economic problems in health-care markets.**
   - Three economic problems in health-care markets are (1) asymmetric information, (2) missing insurance markets, and (3) public-health externalities.
   - Adverse selection results in some of the healthiest choosing not to insure.
   - Suppliers of health-care services have private information and buyers cannot monitor and control the quality and cost of service.
   - The HMO controls costs by using a limited number of health-care providers and monitoring them.
   - The market underprovides health care because it excludes those with the greatest health problems and because health care has external benefits.
   - Other countries have comprehensive national health-care systems with lower cost but limited choice. Health-care vouchers could cut cost, increase coverage, and retain choice.

Key Terms

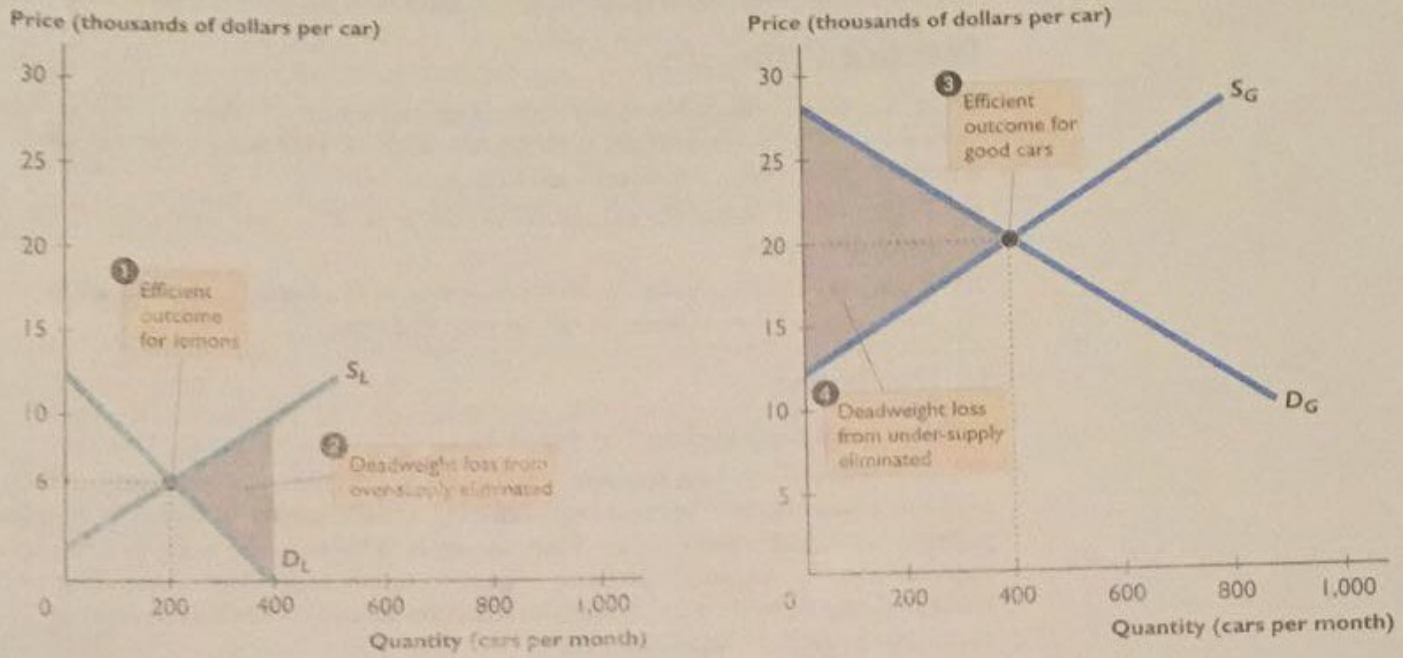
MyEconLab Key Terms Quiz

Adverse selection, 295
Asymmetric information, 292
Lemons problem, 292
Moral hazard, 301
Pooling equilibrium, 297
Private information, 292
Screening, 302
Separating equilibrium, 297
Signaling, 296

FIGURE 12.4

Warranties Make a Used-Car Market Efficient

MyEconLab Animation



1 The demand for and supply of lemons determine the equilibrium price and quantity of lemons and 2 the deadweight loss from the over-supply of lemons (gray triangle) is eliminated.

3 The demand for and supply of good cars determine the equilibrium price and quantity of good cars and 4 the deadweight loss from the under-supply of good cars (gray triangle) is eliminated.

cost of each quality of car equals its marginal benefit and the deadweight loss that arises with asymmetric information is eliminated.

Pooling Equilibrium and Separating Equilibrium

You've seen two outcomes in the market for used cars. Without warranties, there is only one message visible to the buyer: All cars look the same. So there is one price regardless of whether the car is a good car or a lemon. It is as if all the cars, good ones and lemons, are in one big pool. We call the outcome in a market when only one message is available and an uninformed person cannot determine quality a **pooling equilibrium.** In the example above, only lemons were traded. But in such a market it is possible that a few good cars will be traded, though not enough to make buyers believe they will be lucky enough to get one.

Pooling equilibrium
The outcome when only one message is available and an uninformed person cannot determine quality.

In a used-car market with warranties, there are two messages. Good cars have warranties, and lemons don't. So there are two car prices for the two types of cars. The information created by warranties *separates* good cars and lemons. So we call the outcome in a market when signaling provides full information to a previously uninformed person a **separating equilibrium.**

Separating equilibrium
The outcome when signaling provides full information to a previously uninformed person.

Notice that no government action is needed to get the used-car market to work well. Dealers' warranties, voluntarily provided, do the job. Nonetheless, consumer protection laws in most states include "lemon laws" and a federal "lemon law" specifies statutory remedies for used-car buyers in the event that a dealer fails to honor its warranty.

MyEconLab Study Plan 12.3 Solutions

CHECKPOINT 12.3

Explain the information problems and other economic problems in health-care markets.

Practice Problems

1. Describe the asymmetric information problem in the market for health-care services and explain how the problem is dealt with.
2. What are the sources of inefficiency in the U.S. health-insurance market?

In the News

Your family's health-care costs: $19,393

The average health-care costs of American families who are insured through their jobs is $19,393, up 7.3 percent or $1,319 from last year. Of this increase, workers' out-of-pocket costs rose 9.2 percent. Payroll deductions for insurance coverage rose 9.3 percent. Employers have increasingly been offering health plans with larger deductibles to control their own costs and to force workers to use medical care more selectively.

Source: CNNMoney, May 11, 2011

1. How do larger deductibles help employers to control their own costs?
2. How do larger deductibles change the incentives that people face?
3. How do larger deductibles chosen by employers influence the distribution of health-care costs?

Solutions to Practice Problems

1. In the market for health-care services, the suppliers are physicians, specialists, other health-care professionals, and hospitals. The demanders are patients and the insurance companies that pay most of the patients' bills. Asymmetric information arises because medical workers have private information about a patient's condition, the treatments available, and the cost-effectiveness of the treatment they prescribe. They face moral hazard. HMOs with insurance companies selecting and monitoring service providers lessen the moral hazard.
2. The sources of inefficiency in the U.S. market for health insurance are pre-existing conditions and other serious health risks that are uninsurable, and underprovision, with 46 million Americans having no health insurance and millions more being underinsured.

Solutions to In the News

1. Larger deductibles lower the premiums and so lower employers' costs.
2. Larger deductibles strengthen the incentives for: (1) Healthy families to buy health-care insurance; (2) People not to visit the doctor with minor health problems; (3) People with unhealthy lifestyles to try to reform.
3. Larger deductibles chosen by employers lower their own share of health-care costs and increase the out-of-pocket costs of their insured employees.

Resources in the public health-care system are allocated by physicians, specialists, and hospitals and are based on urgency of need, which results in patients often being placed on lengthy waiting lists.

No one is permitted to opt out of the national health service but in most countries, everyone is permitted to buy private insurance and private health care. In these countries, what is called a "two-tier" system sometimes emerges in which the rich buy private insurance and get higher-quality care and the poor get their health care from a lower-quality state system.

In a few countries, there is no private option. It is illegal to open a private clinic and sell private insurance that covers basic care provided by the state system. The idea of this restriction is to avoid the "two-tier" outcome.

EYE on the GLOBAL ECONOMY

Health-Care Expenditures and Health Outcomes

The best health care in America is the best in the world. But access to the best is not universally available and the inequality in access to health care in the United States is greater than in other similarly rich nations.

Figures 1 and 2 below compare the United States with seven other rich countries on health-care expenditures and a health-care efficiency index.

The expenditure data in Figure 1 are average dollars spent on health care per person in each country.

The efficiency data in Figure 2 are based on life expectancy, health inequality, and the fairness of financing health care.

The comparisons in the figures make U.S. health care look the most costly and least efficient among these countries. But the comparison ignores international trade in health-care services. Tens of thousands of Canadians and people from other countries come to the United States to get high-quality health care. Expenditure on these foreigners raises U.S. expenditure in Figure 1 and the greater healthiness of these foreigners raises the efficiency indexes of other countries in Figure 2.

Figure 1 Expenditure per Person

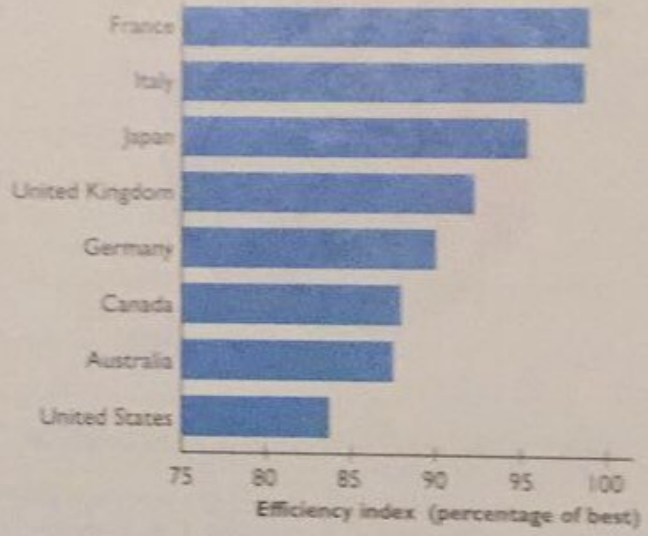


Figure 2 Overall Efficiency of Health-Care System

SOURCES OF DATA: OECD and the World Health Organization.

EYE on the MARKET FOR USED CARS

How Do You Avoid Buying a Lemon?

The used-car market in the United States might have a lemons problem, but it definitely works: It is a very active and successful market.

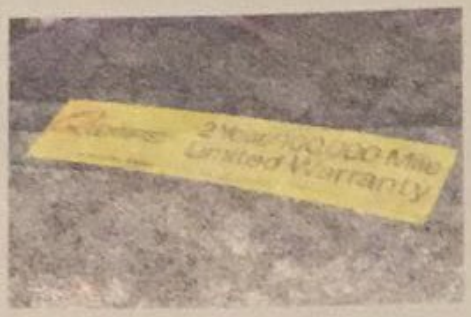
In 2008 (the latest year for which data are available), 50,000 used-car dealers sold 37 million cars at an average price of $8,000 per car.

This scale of operation contrasts with the market for new cars in which around 40 domestic and foreign producers sold 13 million cars at an average price of $26,500 per car.

The stock of cars on U.S. roads is 250 million, so with 37 million being traded, more than one car in seven changes hands each year.

What makes this market work and helps it overcome the lemons problem? The answer is dealers' warranties and third-party inspection services.

By offering warranties, dealers *signal* that the cars they are selling are free from defects and, if a car should turn out to be a lemon, the dealer will bear the cost of fixing it.



MyEconLab Snapshot

Signaling
When an informed person takes an action that sends information to uninformed persons.

A Used-Car Market with Dealers' Warranties

How can used-car dealers convince buyers that a car isn't a lemon and that it is worth more than a lemon? The answer is: By giving a guarantee in the form of a warranty, the dealer *signals* which cars are good ones and which cars are lemons.

Signaling occurs when an informed person takes actions that send information to uninformed persons. The grades and degrees that a university awards students are signals. They inform potential (uninformed) employers about the abilities of the people they are considering hiring—see *Eye on Your Life* on p. 309.

In the market for used cars, dealers send signals by giving warranties on the used cars they offer for sale. The message in the signal is that the dealer agrees to pay the costs of repairing the car if it turns out to have a defect.

Buyers believe the signal because the cost of sending a false signal is high. A dealer who gives a warranty on a lemon ends up bearing a high cost of repairs—and gains a bad reputation. A dealer who gives a warranty only on good cars has few repair costs and a reputation that gets better and better. It pays dealers to send an accurate signal, and it is rational for buyers to believe the signal.

So a car with a warranty is a good car; a car without a warranty is a lemon. Buyers are now effectively as informed as sellers, so the demand for cars depends on whether the car is a good one or a lemon. Because the willingness to pay for a good car is greater than that for a lemon, the demand for good cars is greater than the demand for lemons. But there is still a demand for lemons from people with a low income and a skill at fixing faulty cars.

So there are now two markets for used cars: one for good cars and one for lemons and in each market there is a price. Warranties solve the lemons problem and enable the used-car market to function efficiently.

Figure 12.4 illustrates this outcome. In part (a) the demand for and supply of lemons determine the price of a lemon. In part (b), the demand for and supply of good cars determine the price of a good car. Both markets are efficient. The marginal

Health Maintenance Organizations partly address this moral hazard problem. By working with a limited number of service providers, an insurance company can monitor the quality of the service and control costs. But even with this arrangement, the service provider has more information than the insurer so the problem is lessened but not completely overcome.

■ Missing Insurance Market

Many people can't get private health insurance because they are too old or too sick or too disabled. Others with pre-existing conditions can get insurance but only with exclusions of the very health problems they are most likely to encounter. These are the people who have the greatest wants for health care but the least ability to get it without some alternative to the free market.

The missing insurance market is one that is blind to a person's known health risks. This market can be provided only with government intervention.

The U.S. health-care system deals with this problem by government provision of health insurance. Medicare pays the hospital costs and subsidizes the treatment costs of the aged (over 65) and some of the long-term disabled. Medicaid pays the health-care costs of those living in poverty and with long-term health-care needs.

These government programs provide health insurance for 93 million people but miss an estimated 48 million (see *Eye on the U.S. Economy* below). The total expenditure on them is driven by patient demand, not by decisions of Congress. As the population gets older and advances in medical technology keep people alive longer with expensive treatments, the cost of these programs grows.

■ Public-Health Externalities

The control of infectious diseases is a *public good* (see Chapter 11, p. 267). So public sanitation systems, which general public health relies upon, are provided by governments to avoid a *free rider problem* (see Chapter 11, p. 269).

Vaccination against an infectious disease is a *private good*, but one with a *positive externality* (see Chapter 10, pp. 242 and 254–259). People who get a flu shot protect not only themselves but everyone with whom they come into contact. The marginal social benefit of flu shots exceeds the marginal private benefit.

The efficient quantity of flu shots exceeds the quantity that an unregulated market would provide. This feature of health care is a further reason why it is efficient to subsidize the care of the aged and those in poverty.

You've seen three economic reasons why health care isn't an ordinary good that we can expect the unregulated market to provide efficiently. You've also seen that U.S. health care is provided by a mixture of private and public insurance. How do the U.S. health-care markets compare with those in other countries?

■ Health-Care Systems in Other Countries

Every major country except the United States has a comprehensive national health-care system. Every person is insured under a government-funded national insurance program. Health-care services are provided by private clinics, hospitals, physicians, and specialists but they are paid for by governments.

Government expenditure on health care is financed by specific health insurance taxes and by general income taxes.

12.3 HEALTH CARE MARKETS

MyEconLab Snapshot

We're going to look at the health care markets of the United States from an economic perspective. What are the economic problems these markets face? How do our health care arrangements deal with these problems? How do other countries deal with the same problems? Does U.S. health care need reform?

Economic Problems in Health Care Markets

Health care is two distinct products: health insurance—insurance that pays health care bills—and health care services—the services of physicians, specialists, nurses, other health care professionals, and hospitals.

Left to competitive market forces with no government intervention both health insurance and health care services would be underprovided for three economic reasons:

- Asymmetric information
- Missing insurance market
- Public health externalities

Asymmetric Information

Asymmetric information, which brings adverse selection and moral hazard, is present in both markets. In the insurance market, the buyers have private information and in the care market the sellers have private information.

Adverse Selection and Moral Hazard in Health Insurance Some people exercise, eat healthy diets, watch their weight, and rarely get sick. Others are couch potatoes who don't exercise, eat high-fat and high-sugar diets, are overweight, and not only get sick more often but also are at long-term risk for diabetes and heart disease.

Information about whether a person has a healthy or unhealthy lifestyle is private information not available to the insurance companies.

Adverse selection arises because some of the healthiest people choose to be uninsured, at least during their younger years. *Moral hazard* arises because once insured, a person has less incentive to adopt a healthy lifestyle and some will yield to the temptation to drift into unhealthy habits.

Faced with a lack of information about individual lifestyle choices, health insurance providers (like auto insurance suppliers) offer lower premiums with high deductibles so that buyers can *reveal* information about their lifestyle. The fittest and healthiest choose a high deductible and low premium and the least fit and unhealthiest choose a low deductible and high premium. The market finds a *separating equilibrium*.

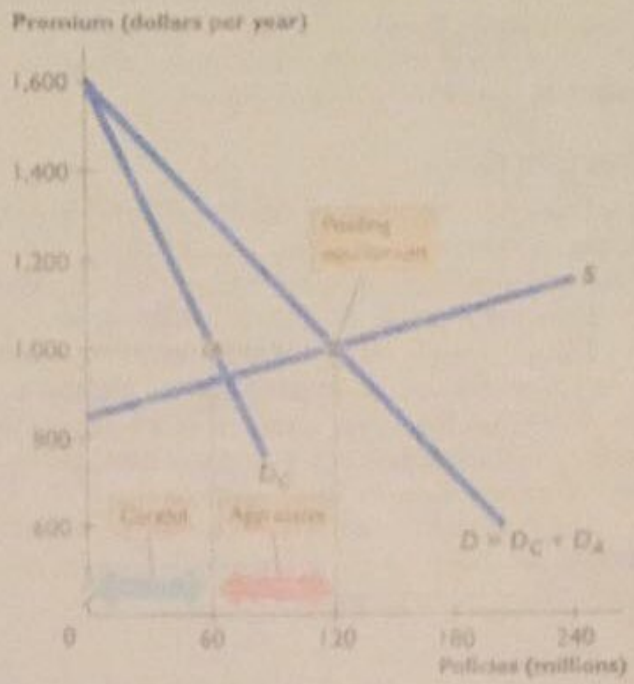
Moral Hazard in Health Care Services High-quality providers of health care services diagnose and prescribe treatments reliably and at the lowest possible cost. Low-quality providers make diagnosis errors and over-prescribe expensive drugs and other treatments. But the information about the quality and reliability of the health-care provider is private. The buyers (patients and insurance companies) don't know the quality of the providers. In this regard, the market for health-care services is like the market for used cars.

Moral hazard arises that increases the cost of health-care services. Providers have an incentive to play safe and overtreat a patient. Neither the patient nor the insurance company has information with which to prevent this inefficiency.

FIGURE 12.5

Inefficient Pooling Equilibrium in an Auto Insurance Market

MyEconLab Anima



With no information on driver type insurance companies offer all drivers the same deal. The insurance supply curve is S.

The demand curve D_C is the demand for auto insurance by careful drivers. The demand curve $D = D_C + D_A$ is the demand for auto insurance by all drivers. The horizontal distance between the two demand curves is the quantity demanded by aggressive drivers at each premium level.

A pooling equilibrium occurs at the intersection of S and D at a premium of $1,000 a year with 120 million insured drivers divided equally between careful and aggressive.

In this equilibrium, moral hazard and adverse selection make insurance companies look for ways of separating the two driver types.

Moral Hazard

Moral hazard is the tendency for a person with private information to use it in ways that impose costs on an uninformed party with whom they have made an agreement.

Moral hazard arises in many settings. For example, big banks face moral hazard. They know they are too big for governments to let them fail so they make loans that are too risky. Insurance companies face moral hazard because an insured person is less likely than an uninsured person to behave in ways that avoid the insured loss. For example, fire insurance lessens the incentive to install smoke detectors, fire alarms, and a sprinkler system.

In the case of auto insurance, a driver with full collision coverage has less incentive than a driver with little or no collision coverage to drive carefully. Once a person has bought insurance, her or his incentives change and the change adversely affects the interest of the insurance company.

Moral hazard
The tendency for a person with private information to use it in ways that impose costs on an uninformed party with whom they have made an agreement.

Adverse Selection

Adverse selection arises because people at greater risk are more likely to buy insurance than those for whom a risk is very small. For example, a person with a family history of serious illness is more likely to buy health insurance than a person with a family history of good health. Similarly, an aggressive driver is more likely than a careful driver to take the fullest possible coverage. So more of the insured risks arise from the activities of the riskiest people.

Insurance companies have an incentive to find ways around the moral hazard and adverse selection problems. By doing so, they can lower premiums for low-risk people and raise premiums for high-risk people.

Sellers' Decisions and Supply

Now think about the sellers of used cars, who know the quality of their cars. There is nothing special about this supply. Sellers know their marginal cost, so they know the quantity they are willing to supply at a given price. The marginal cost of a lemon is less than that of a good car and over a range of low prices, only lemons are supplied. At higher prices, the quantity of lemons supplied falls off and good cars start to be supplied.

Figure 12.2 shows an example of what the supply curves might look like. In this example, lemons are offered for sale at prices up to $12,000 and at that price all the lemons available are supplied and good cars start to be offered for sale.

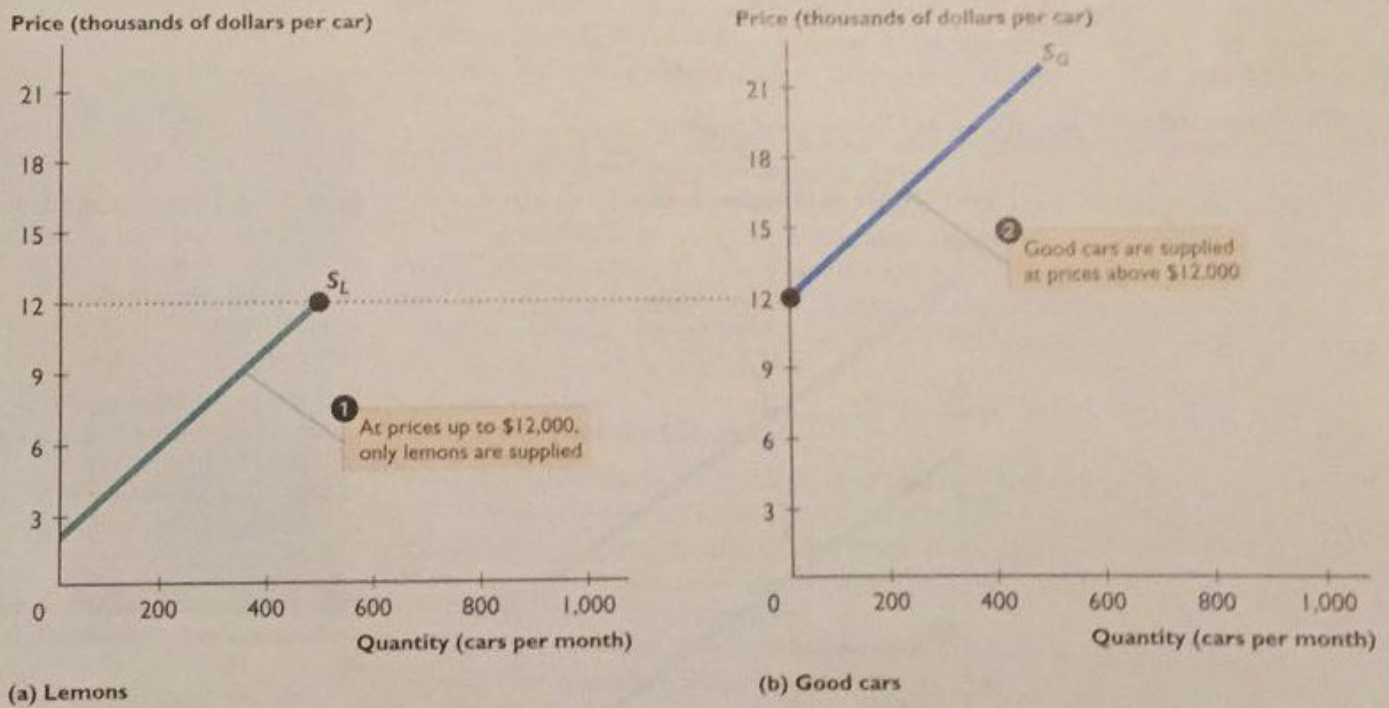
The Market Outcome

Demand and supply determine the price of a used car and the quantity traded, but the market doesn't work well. To explain, we'll focus on an extreme outcome in which only lemons get traded.

Suppose that buyers have learned from their friends that everyone who has bought a used car got a lemon. They assume that they, too, will get a lemon. Consequently, the demand for used cars is based on the willingness to pay for a lemon. The market demand is the demand for lemons, which delivers a low market price. At this low market price, good cars are worth more to their owners than

FIGURE 12.2
The Supply of Used Cars

MyEconLab



Suppliers of used cars know the quality of what they offer for sale.

1 At prices below $12,000, only lemons are offered for sale and the supply curve of lemons is S_L.

2 At prices above $12,000, good cars are offered for sale and the supply curve of good cars is S_G.

Instructor Assignable Problems and Applications

MyEconLab Homework, Quiz, or Test if assigned by instructor

1. Describe the used-car market in the United States. How many used cars get traded per year and at what average price? How does the market enable buyers to avoid lemons? What role, if any, do governments play in the used-car market?
2. Zaneb is a high-school teacher and is well known in her community for her honesty, integrity, and sense of social responsibility. She is shopping for a used car. She plans to borrow the money to pay for it from her local bank, and she plans to buy auto insurance from her local insurance company. What asymmetric information problems is Zaneb likley to encounter and what arrangements are likely to help cope with those problems? Explain your answers.
3. Suppose that there are two national football leagues: The Time League and The Bonus for Win League. The players have private information about their effort. In The Time League, players receive a fixed wage based on the time they spend practicing and playing matches. In The Bonus for Win League, the players are paid one wage for a loss, a higher wage for a tie, and the highest wage of all for a win. Describe the moral hazard and adverse selection problems in these two leagues. Which league best addresses these problems?
4. **Phillies hamstrung by no-trade clause**
   Phillies general manager Pat Gillick, who previously built winners in Toronto, Baltimore, and Seattle, is no fan of blanket no-trade clauses. Gillick is so averse to giving out complete no-trade provisions that he says it could be a "deal breaker" when the Phillies negotiate with big free agents this winter.

   Source: ESPN.com, November 8, 2000

   Provide an example of private information that a baseball player who wants a no-trade clause possesses. Does a baseball player with a long-term contract that includes a no-trade clause present a moral hazard to his baseball team? Does a baseball player with a long-term contract that includes a no-trade clause present adverse selection problems to his baseball team?
5. What are the key economic problems in providing an efficient quantity and distribution of health-care insurance and service? Explain how the U.S. health-care system addresses these problems.
6. What are HMOs and what information problems do they help to deal with?
7. What are the problems that Medicare and Medicaid address and what problems do they cause?
8. What is the cost of health care in the United States compared to that in Canada and major European countries? Do health outcomes correlate with health-care costs? Can you think of explanations for the facts you've just provided?
9. What is Laurence Kotlikoff's proposal for fixing health care in the United States? Draw a graph to illustrate how his proposal would work and show whether it could be efficient.

How do you avoid buying a lemon?

Markets with Private Information

12

CHAPTER CHECKLIST

When you have completed your study of this chapter, you will be able to

1. Describe the lemons problem and explain how the used-car market solves it.
2. Describe the asymmetric information problems in the insurance market and explain how they are solved.
3. Explain the information problems and other economic problems in health-care markets.

MyEconLab Big Picture

Now think about Greg's dilemma. He has found a car priced at $15,990 (in the photo). He likes the look of the car, but is it a good one or a lemon? If the car is a good one, he gets a marginal benefit of, and would be willing to pay, $20,000. So buying the car for $15,990 gives him a consumer surplus of $4,110. But if the car is a lemon, his marginal benefit is only $10,000, so paying $15,990 for the car leaves him with a negative consumer surplus (a consumer deficit!) of $5,990.

Will Greg pay $15,990? The answer depends on the odds of avoiding a lemon and how Greg regards taking risks. Although he doesn't know the quality of the car, he knows what all his friends have told him about the cars they've bought from the same dealer. If all his friends bought good cars, he will be thinking that this car is most likely a good one too. In this case, he is willing to pay $20,000 and at $15,990, he would buy this car.

But if all Greg's friends bought lemons, he will be thinking that this car is most likely a lemon too. In this case, he is willing to pay only $10,000, so $15,990 is much more than what he would be willing to pay.

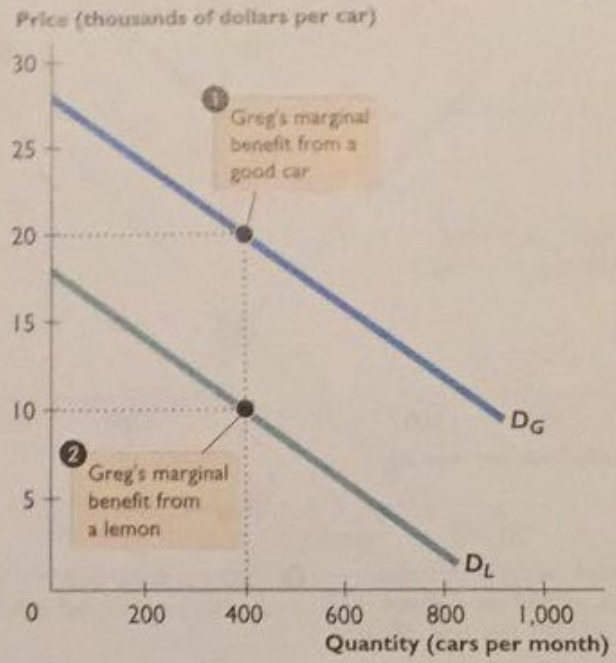
Other buyers are making decisions like Greg's and figuring out what they are willing to pay for a car of unknown quality. Some buyers are willing to pay more than Greg and some less. At higher prices, there are fewer buyers and at lower prices more buyers. The demand curve for used cars slopes downward.

Figure 12.1 illustrates the demand for used cars. If previous buyers say that they've never seen a lemon, buyers expect no lemons and the demand curve for used cars is D_G. If previous buyers say that they've never seen a good car, buyers expect only lemons and the demand curve is D_L. If previous buyers say that some cars were good ones and some were lemons, buyers expect to see some of each type of car and the demand curve will lie between D_G and D_L.

Is this car a good one with a marginal benefit of $20,000 and a consumer surplus of $4,110? Or is it a lemon with a marginal benefit of $10,000 and a consumer "deficit" of $5,990? Will Greg buy it?

FIGURE 12.1
The Demand for a Used Car of Unknown Quality

MyEconLab Animation



1. If all Greg's friends bought good used cars, Greg might expect to buy a good one too and be willing to pay $20,000—his marginal benefit from a good car. The demand curve for good cars is D_G.
2. If all Greg's friends bought lemons, Greg might expect to buy a lemon too and be willing to pay $10,000—his marginal benefit from a lemon. The demand curve for lemons is D_L.

The demand curve for used cars of unknown quality lies between D_L and D_G.

Think about auto collision insurance. You know that there is a chance that you will be involved in an auto accident. The chance is small but always present. If you do have an accident and your car gets seriously damaged, you face the cost and inconvenience of getting it fixed. Worse, if you suffer serious personal injury, you also face a loss of income and the cost of medical care. For you, the cost of an auto accident is large and if you had to bear such cost, you'd like some help.

Because the chance that you will have a serious and costly auto accident is small, you can get that help by making a deal with an auto insurance company that is beneficial to both you and the insurer. You pay an annual premium to the insurance company and the company pays you a sum of money based on an agreed formula if you have an accident and incur a loss.

Insurance companies can get information from statistics on past accidents and costs that enable them to determine the premiums and payout conditions they can offer and still earn a profit. None of the company's policyholders knows whether they'll have an accident and the insurance company doesn't know *who* will have an accident, but it knows *how many* accidents there will be and what they will cost. An insurance company can *pool* the risks of a large population and enable everyone to share the costs.

People are happy to buy insurance at prices that enable insurance companies to make a profit because they are risk averse—they don't like risk—and by spreading the risk, insurance companies lower the risk for everyone.

But insurance companies do have a problem and it is a general problem that affects all types of insurance: Their customers have private information about their own behavior and its effects on the likelihood that they will make an insurance claim. There is asymmetric information in the insurance market.

Asymmetric Information in Insurance

Although asymmetric information is present in all types of insurance, we'll stick with auto collision insurance. Some drivers are careful and some are aggressive. A careful driver is less likely to have an accident than an aggressive driver. Each driver knows which type he or she is, but the insurance company doesn't know. Yet it would benefit the insurance company to know, for it could then charge the higher-risk aggressive driver a higher premium and the lower-risk careful driver a lower premium.

Without knowledge about driver types, all insured drivers get the same deal. There is a *pooling equilibrium* like that in the used-car market without dealer warranties. Careful drivers and aggressive drivers pay the same premium, but the insurance companies incur losses on aggressive drivers and make profits on careful drivers.

Figure 12.5 illustrates this pooling equilibrium outcome. The demand for collision insurance by careful drivers is D_C and the demand by all drivers is D. The horizontal distance between the curves D_C and D is the quantity demanded by aggressive drivers at each price.

The insurance companies don't know the driver type to which they are selling, so the supply curve, S, is the same for all drivers. It is based on an average of the marginal cost of insuring an aggressive driver and the marginal cost of insuring a careful driver.

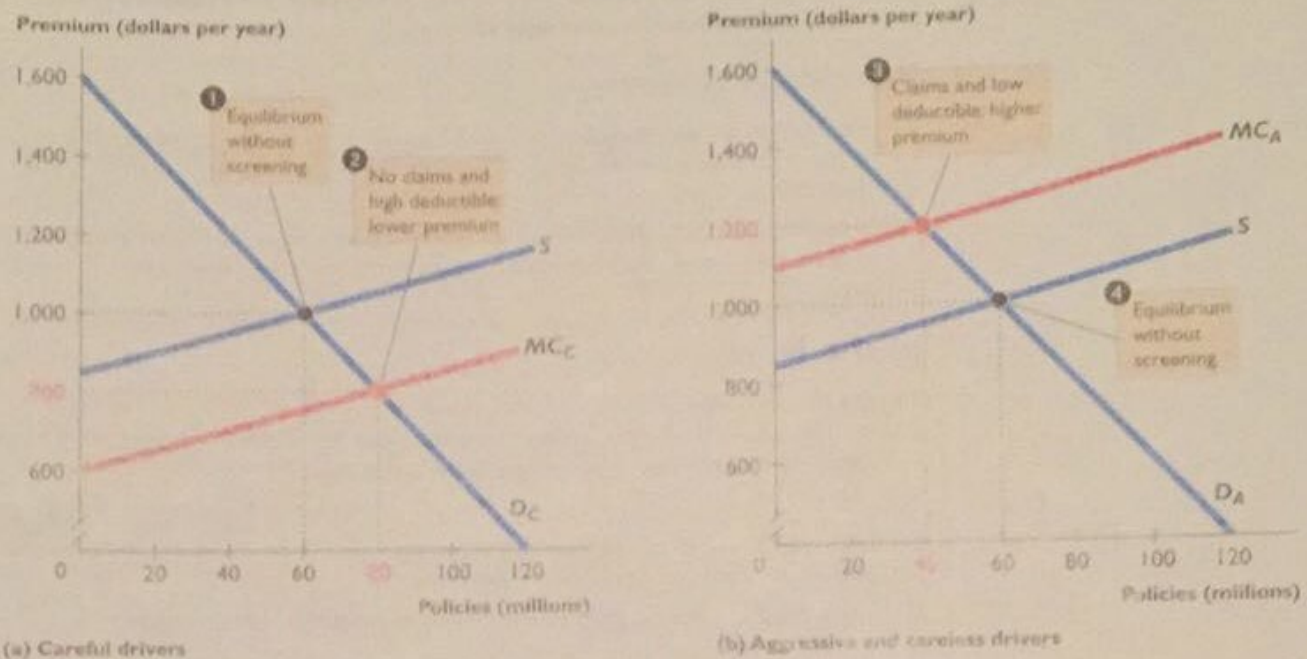
In this example, the equilibrium premium is $1,000 a year and 60 million careful drivers and 60 million aggressive drivers are insured.

You're now going to see that this outcome is inefficient for two reasons: it creates moral hazard and adverse selection.

FIGURE 12.6

Two Outcomes in Auto Insurance Compared

MyEconLab Animation



Careful drivers in part (a) have demand curve D_C and aggressive and careless drivers in part (b) have demand curve D_A. With no screening, the supply curve of insurance is S in both parts.

1 Without screening the equilibrium premium is $1,000 and 60 million drivers are careful and 60 million are aggressive and careless.

With screening, the supply of insurance to careful drivers is MC_C in part (a) and to aggressive and careless drivers is MC_A in part (b).

In part (a), 2 equilibrium occurs at a premium of $800 and 80 million drivers reveal that they are careful.

In part (b), 4 equilibrium occurs at a premium of $1,200 and 40 million drivers reveal that they are aggressive or careless.

In a separating equilibrium, 20 million drivers switch from being aggressive to being careful.

Without screening provided by a no-claim bonus and deductible, insurance companies offer the same supply of insurance to all drivers. The equilibrium without screening is the same as in Figure 12.5: Everyone pays $1,000 a year and there are 60 million of each type of driver.

With screening, the insurance companies base their supply to each group on the marginal cost (*MC*) of serving them. For careful drivers in part (a), the supply curve is MC_C. The equilibrium insurance premium is $800 a year and the number of drivers who are, or who behave as if they are, careful increases to 80 million. Without screening, the market *under*provides insurance to this group and is inefficient. With screening, the market is efficient.

For the aggressive drivers in part (b), the marginal cost of serving them is MC_A and this marginal cost determines the supply to this group. The equilibrium insurance premium is $1,200 a year and the number of drivers who remain aggressive decreases to 40 million. Without screening, the market *over*provides insurance to this group and is inefficient. Again, with screening, the market is efficient.

You've now seen two examples of markets with asymmetric information in which the creative signaling and screening overcomes what would be a market failure and achieves an efficient outcome.

they would get from selling them, so no good cars are offered for sale: only lemons are available. So lemons are the only cars traded.

Figure 12.3 illustrates the used-car market that we've just described. The demand for used cars, D, is equal to the demand for lemons, D_L. The supply of used cars, S, is the supply of lemons up to $12,000 a car (the green segment of the supply curve) and the supply of lemons plus the supply of good cars at prices above $12,000 (the blue segment of the supply curve).

The equilibrium price is $10,000 per car and 400 lemons are traded each month.

Adverse Selection

This market suffers from adverse selection, a general problem that arises in markets with private information. **Adverse selection** is the tendency for people to enter into transactions that bring them benefits from their private information and impose costs on the uninformed party.

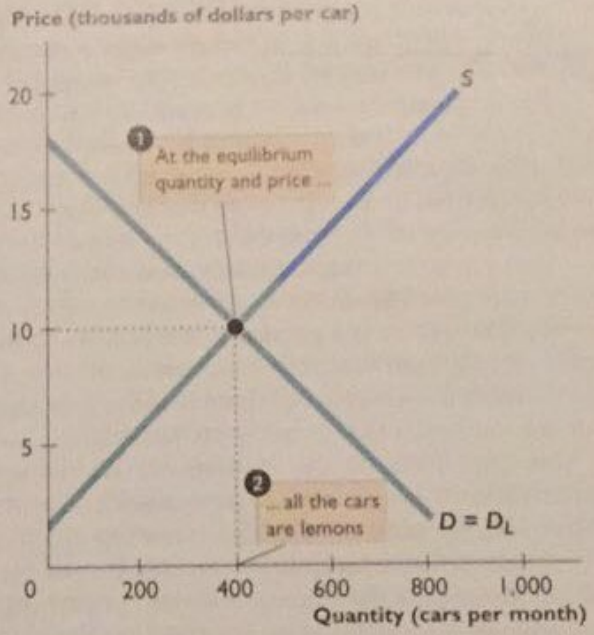
Adverse selection
The tendency for people to enter into transactions that bring them benefits from their private information and impose costs on the uninformed party.

For example, Jackie hires salespeople and offers them a fixed wage contract. The only people Jackie attracts are lazy workers. Hardworking salespeople don't work for Jackie because they can earn more by working for someone who pays by results. Jackie's fixed-wage contract adversely selects those with private information—knowledge that they are lazy in this case—who use that knowledge to their own benefit and to impose costs on Jackie.

In the used-car market, the low price adversely selects lemons. The owners of lemons have a greater incentive to offer their cars for sale. In the extreme case (and in the above example), good cars disappear from the market. The owners of good cars have no incentive to offer them for sale. They hold on to their good cars because the market price is less than their marginal benefit.

FIGURE 12.3
The Lemons Problem in a Used-Car Market

MyEconLab Animation



The demand for used cars is the demand for lemons, so the demand curve is $D = D_L$. The supply curve of used cars is S. The green portion of the curve is the supply of lemons and the blue portion adds the supply of good cars.

1. The equilibrium price of a used car is $10,000.
2. 400 used cars a month are traded and they are all lemons. At the equilibrium price, no good cars are offered for sale.

MyEconLab Snapshot

Screening
When an uninformed person creates an incentive for an informed person to reveal relevant private information.

Screening in Insurance Markets

Screening occurs when an uninformed person creates an incentive for an informed person to reveal relevant private information. Insurance companies use the "no-claim" bonus and the deductible as *screens* to separate high-risk aggressive drivers and low-risk careful drivers and set premiums in line with the risk arising from the two types of drivers.

No-Claim Bonus

A *no-claim bonus* is a discount in the insurance premium for drivers who don't make claims. A driver accumulates a no-claim bonus by driving safely and avoiding accidents. The longer the period of no claim, the greater is the no-claim bonus. And the greater the bonus, the greater is the incentive to drive carefully.

The no-claim bonus enables the informed driver to reveal her or his type to the uninformed insurance company and get insurance at a lower price, in line with the lower risk that the driver presents. A driver who makes claims also reveals her or his type to the insurance company and gets insurance at a higher price, in line with the higher risk that the driver presents.

The no-claim bonus helps to lessen the moral hazard problem. With a bonus at stake for making a claim, a driver has a stronger incentive to be careful and try harder to avoid accidents.

Insurance companies try to make a careless driver or an aggressive driver pay a higher premium...

Deductible

Insurance companies also use a deductible. A *deductible* is the amount of a loss that the insured person agrees to bear personally. The larger the deductible, the lower is the premium, and the decrease in the premium is more than proportionate to the increase in the deductible. By offering insurance with full coverage—no deductible—on terms that are attractive only to aggressive high-risk drivers and by offering coverage with a deductible on more favorable terms that are attractive to careful low-risk drivers, insurance companies can do profitable business with everyone. Aggressive high-risk drivers choose policies with a low deductible and a high premium; careful low-risk drivers choose policies with a high deductible and a low premium.

The size of the deductible chosen reveals to the insurance company whether the driver is aggressive or careful.

... than a careful driver.

Separating Equilibrium with Screening

With screening that indicates driver types, insurance companies can supply insurance on different terms to the different groups. With only two groups, aggressive and careful, it can offer premiums at two different levels: A higher premium for aggressive drivers and a lower premium for careful drivers. The higher premium is an incentive for aggressive drivers to behave as if they were careful, so the number of aggressive drivers decreases and the number of careful drivers increases. The outcome is a separating equilibrium.

Figure 12.6 illustrates this outcome and contrasts it with the pooling equilibrium that arises without screening.

Figure 12.6(a) shows the situation for careful drivers and 12.6(b) for aggressive drivers. We're assuming that the two groups are of equal size in the sense that they have identical demand curves, D_C and D_A (as before in Figure 12.5). But as you're about to see, the two groups don't end up of equal size when they have responded to the incentives they face.

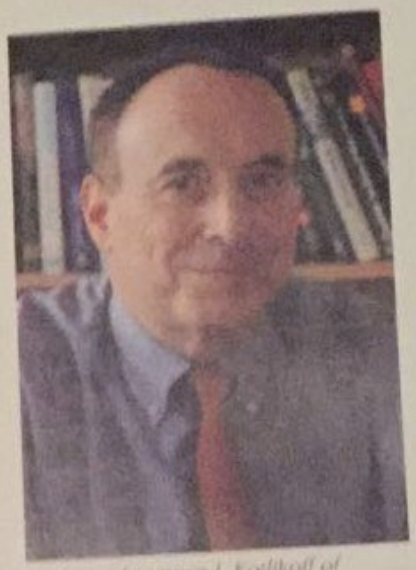
The comprehensive national health systems limit choice and impose long waiting times. But they do contain costs and they do so without, apparently, compromising the overall quality of health outcomes. *Eye on the Global Economy* on p. 308 provides some details.

A Reform Idea

The Medicare and Medicaid programs are in effect an open-ended commitment of public funds to the health care of the aged and those too poor to buy private health care. Health care in the United States faces two problems. Too many people are uninsured and health care costs too much. These problems are going to get worse if nothing major is done to reverse a trend.

The Protection and Affordable Care Act (known as Obama-care) addresses the first of these problems by requiring everyone to be insured and by creating a new Pre-Existing Condition Insurance Plan, financed partly by the government. But the Act does little to address the problem of overexpenditure, and this problem is extremely serious. It is so serious that without massive change, the present open-ended health-care programs will bankrupt the United States.

A solution to both the problem of coverage and access and the problem of over-expenditure has been suggested by Laurence Kotlikoff, an economics professor at Boston University. His proposal uses health care vouchers to ensure universal coverage and a cap on total expenditure. Everyone would get a voucher, and those with higher expected healthcare costs would get a bigger voucher. Health-care vouchers would work like the education vouchers that we explain in Chapter 10 (see pp. 288–289). They would provide the cost discipline of the European and Canadian systems with the choice that is so important and valued by Americans.



Professor Laurence J. Kotlikoff of Boston University, author of The Healthcare Fix *and creator of* Medicare Part C for All.

EYE on YOUR LIFE

Signaling Your Ability

You've seen how used-car dealers signal with warranties. You, too, send signals.

You know how smart you are and how hard you're willing to work. But this information is private. It is known to you but not to your potential employers.

How can you signal your ability to potential employers? The answer is by your choice of education.

Michael Spence, an economist at Stanford University and joint winner of the 2001 Nobel Prize with George Akerlof and Joseph Stiglitz, explained how education choices send signals.

Think of people as having just two possible levels of ability: either high or low. Each person knows her or his own ability, but potential employers don't have this information.

People send signals to potential employers by their choice of education. For a low-ability person, the opportunity cost of a university education is high—not just the tuition and cost of books, but the cost in time and effort to get passing grades.

For a high-ability person, the opportunity cost of a college or university education is lower. For those people, good grades take hard work but they can be attained with reasonable effort. So only people with high ability choose a college or university education.

Employers know each person's education (and grades), so they can offer a high wage for high ability and a low wage for low ability. There is a separating equilibrium in the market for workers of differing ability.

Even if your education contributed nothing to improve ability, it would still signal your ability.

EYE on the U.S. ECONOMY

Health Care in the United States: A Snapshot

Expenditure on health care takes 17.8 percent of U.S. incomes. Fifty-six percent of this expenditure is private—spending on health-care insurance and out-of-pocket payments for health-care services. The rest is financed by taxes—spending by federal and state governments on Medicare, Medicaid, and other public programs.

Figure 1 shows the distribution of the health-care dollar across these types of expenditure.

Of the 328 million people in the United States, 166 million have private health insurance.

More than one half of all employed people—about 70 million—buy health insurance through their employer.

Tax breaks are available on health insurance payments, the largest being for the self-employed who can deduct the entire payment.

About 75 million people limit their health-care cost by using a Health Maintenance Organization (HMO).

The federal and state Medicare and Medicaid programs cover 93 million people.

An estimated 48 million have no health-care insurance, and a further 25 million are reckoned to be underinsured—have some insurance but not enough for a big emergency.

Some of the uninsured are healthy and choose not to insure. Others can't afford insurance and don't qualify for Medicare or Medicaid.

Per person covered, government programs are more costly than private insurance because they serve the aged, the disabled, and the chronically sick.

Figure 2 shows expenditure per person. With 93 million people covered by Medicare and Medicaid at a total cost of $966 billion, governments spend $10,387 per person per year on public programs.

The cost of private insurance per person covered is 46 percent of the cost of the government programs at $4,826 per person per year.

Out-of-pocket expenditure, which includes spending by the uninsured, is $2,342 per person per year.

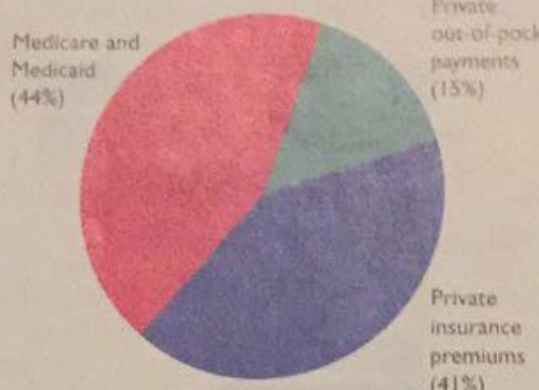


Figure 1 Private and Public Expenditures on Health Care

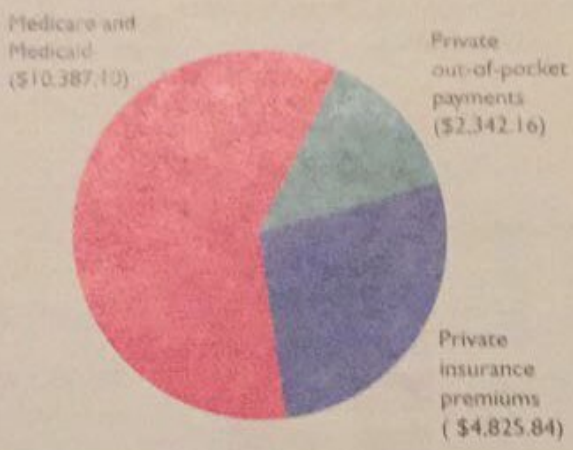


Figure 2 Private and Public Expenditures per Person

SOURCE OF DATA: U.S. Bureau of the Census, *Statistical Abstract of the United States*: 2011, Tables 135 and 1222.

12.2 INFORMATION PROBLEMS IN INSURANCE MARKETS

MyEconLab Snapshot

Just as buyers and sellers gain from trading goods and services, so they can also gain by trading risk. But risk is a "bad," not a good. The good that is traded is *risk avoidance*. A buyer of risk avoidance can gain because the value of avoiding a risk is greater than the price that must be paid to others to get them to bear shares of it. And a seller of risk avoidance faces a lower cost of risk than the price that people are willing to pay to avoid it.

People trade risk in financial markets and insurance markets. Here, we'll focus on insurance markets.

Insurance Markets

You can see in *Eye on the U.S. Economy* below that insurance plays a huge role in our economic lives.

Insurance reduces the risk that each person faces by sharing or *pooling* the risks. When you buy insurance against the risk of an unwanted event, you pay an insurance company a *premium*. If the unwanted event occurs, the insurance company pays you the amount of the insured loss.

EYE on the U.S. ECONOMY

Insurance in the United States

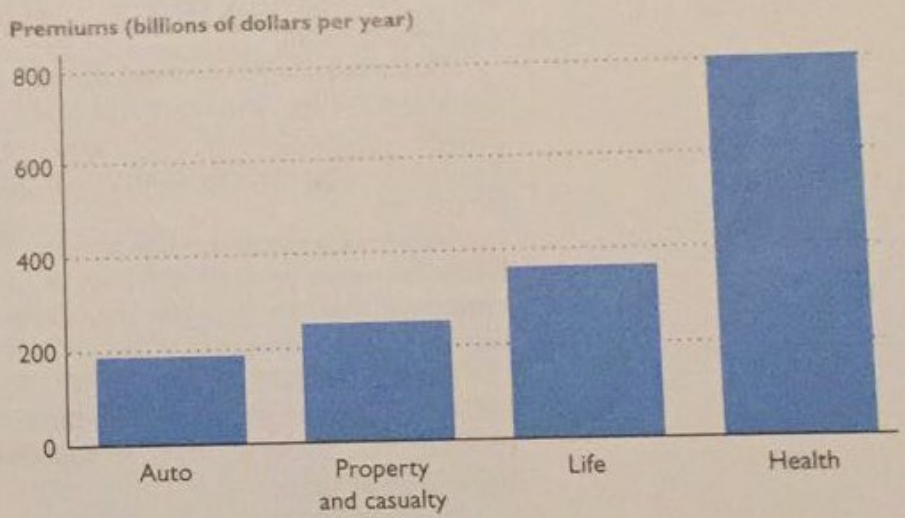
We spend 11 percent of our income on insurance. That's more than we spend on cars or food. In addition, we buy Social Security and unemployment insurance through our taxes.

Auto insurance reduces the risk of financial loss in the event of an auto accident or theft. We spent $179 billion on this insurance in 2009 (see the figure).

Property and casualty insurance reduces the risk of financial loss in the event of an accident involving damage to property or persons. It includes workers' compensation and fire insurance. We spent $244 billion on this insurance in 2009.

Life insurance reduces the risk of financial loss in the event of death. Almost 80 percent of households in the United States have life insurance, and the amount paid in premiums in 2009 was $356 billion.

Health insurance reduces the risk of financial loss in the event of illness. It can provide funds to cover both lost earnings and the cost of medical care. We spent $801 billion on this type of insurance in 2009.



SOURCE OF DATA: U.S. Bureau of the Census, *Statistical Abstract of t United States*: 2012, Tables 135 and 122

MyEconLab Snapshot

12.1 THE LEMONS PROBLEM AND ITS SOLUTION

In all the markets that you've studied so far, buyers and sellers are well informed about the features and the value of the item being traded. Buyers know the benefits they get and sellers know the costs they incur. The buyers' marginal benefit determines demand, the sellers' marginal cost determines supply, and demand and supply together determine the equilibrium price and quantity. And if none of the obstacles to efficiency described in Chapter 6 (see p. 156) are present, the market allocates resources efficiently.

Private information
Information relevant to a transaction that is possessed by some market participants but not all.

Asymmetric information
A situation in which either the buyer or the seller has private information.

In some markets, either the buyer or the seller has some relevant information to a transaction—**private information**—that the other lacks. One of these markets is the one for used cars. In this market, each seller has private information about the quality of the vehicle offered for sale. When you buy a used car, you hope it isn't a lemon, but until you have driven it for a month or two, you won't know for sure. But the person who sells you the car knows. When one side of a market has private information, we call the situation one of **asymmetric information**—a situation in which *either* the buyer *or* the seller has *private information*. How does a market with asymmetric information work? What determines the equilibrium price and quantity? Is the market efficient or inefficient?

These are the questions we'll now answer.

A Market for Used Cars with a Lemons Problem

When a person buys a used car, it might turn out to be a lemon. If the car is a lemon, it is worth less to the buyer than if it has no defects. Does the used-car market have different prices reflecting different qualities—a low price for a lemon and a higher price for a car without defects? It turns out that it does. But the market needs some help in overcoming what is called the **lemons problem**—the problem that when it is not possible to distinguish reliable products from lemons, there are too many lemons—perhaps only lemons—and too few reliable products—perhaps none.

Lemons problem
The problem that when it is not possible to distinguish reliable products from lemons, there are too many lemons and too few reliable products.

George Akerlof of the University of California, Berkeley, and 2001 Nobel Laureate, was the first person to pose the lemons problem and the challenge that it presents for markets to allocate resources efficiently.

To see how the used-car market overcomes the lemons problem, we'll first look at a market that *does* have a lemons problem.

To explain the lemons problem as clearly as possible, we'll assume that there are only two kinds of cars: defective cars—*lemons*—and cars without defects, which we'll call *good cars*. Whether a car is a lemon is private information that is available only to the current owner. The buyer can't tell whether the car for sale is a lemon until after buying it, driving it for a few weeks, and learning as much about it as its current owner knows.

Buyers' Decisions and Demand

Even though the buyers of used cars don't know whether they are buying a good car or a lemon, the law of demand applies. The lower the price of a car, the greater is the quantity of cars demanded. But what determines demand and the willingness to pay is a bit different. To see why, let's think about the choice that a car buyer called Greg is about to make.

Greg wants to buy a used car and he would like to avoid buying a lemon. He knows that for him, the value of a good car—his marginal benefit—is $20,000. But Greg has a low income, some spare time, and he knows how to fix a car, so he would be willing to buy a lemon if he could get it for an appropriately low price—a price equal to his marginal benefit from a lemon, which he says is $10,000.

MyEconLab Study Plan 12.2
Key Terms Quiz
Solutions

CHECKPOINT 12.2

Describe the asymmetric information problems in the insurance market and explain how they are solved.

Practice Problems

1. Pam is a low-risk careful driver and Fran is a high-risk aggressive driver. What might an auto-insurance company do to get Pam and Fran to reveal their driver type?
2. Using Figure 12.6, show the deadweight losses that arise in an equilibrium without screening that are avoided in a separating equilibrium with screening.

In the News

Toyota pre-collision system reduces injuries
Toyota has developed a pre-collision system that helps lower speeds before rear-end impacts and reduce injuries and vehicle damage.

Source: *Postmedia*, April 22, 2013

1. How could auto-insurance companies use the information in the news clip? Is that information private and asymmetric?
2. How might Toyota's pre-collision system influence adverse selection and moral hazard?

FIGURE 1

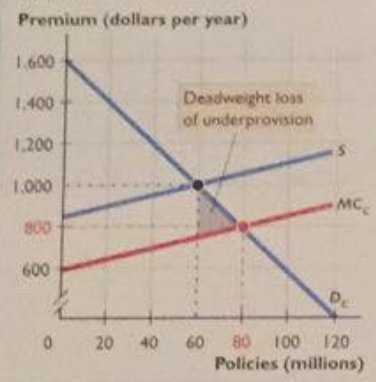
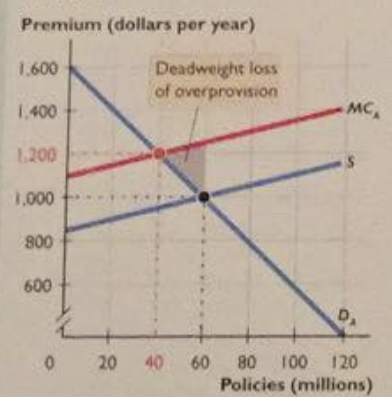


FIGURE 2



Solutions to Practice Problems

1. The insurance company will offer policies with deductibles that enable drivers to reveal their private information. Pam reveals that she is a low-risk driver by taking a high deductible and low premium. Fran reveals that she is a high-risk driver by taking a low deductible and high premium.
2. For low-risk careful drivers, by taking a high deductible and low premium, 80 million get insurance for $800 a year compared to 60 million paying $1,000 a year without screening. The gray triangle in Figure 1 shows the deadweight loss avoided with screening from underprovision without screening.
   For high-risk aggressive drivers, by taking a low deductible and high premium, 40 million get insurance for $1,200 a year compared to 60 million paying $1,000 a year without screening. The gray triangle in Figure 2 shows the deadweight loss avoided with screening from overprovision without screening.

Solutions to In the News

1. The insurance companies know whether a car is a Toyota with a pre-collision system and can use this information to separate the market by known risk differences. But this information is not private and not asymmetric.
2. Adverse selection: Drivers who know their driving style brings a high collision risk are more likely to buy the Toyota with a pre-collision system. Moral hazard: Having bought the Toyota with a pre-collision system, driving carelessly is less dangerous, so some drivers become more careless.

MyEconLab Study Plan 12.1
Key Terms Quiz
Solutions

CHECKPOINT 12.1

Describe the lemons problem and explain how the used-car market solves it.

Practice Problems

An earthquake damaged car factories and decreased the production of popular Japanese cars. The demand for good late-model used cars soared and car dealers scrambled to get their hands on used vehicles.

1. Explain the effect of the earthquake on the price of a good used car and the price of a lemon.
2. If you have a late-model car that you know isn't a lemon, will you sell it privately or sell it to a dealer? Explain your answer.

In the News

Colleges seek "authenticity" in hopefuls

David Lesesne, Dean of Admissions at Sewanee, a Tennessee liberal arts college, said that students have become less authentic to themselves by trying to be what colleges want, but colleges have done the same. Schools are looking to draw more applicants and students are looking to gain acceptance. As those numbers grow I think that has caused both sides of the equation to lose a little focus on what should be most important: the match.

Source: *USA Today*, Aug. 1st 22, 2007

Do the applicants or the colleges have private information? Give an example of such private information. Does this market have an adverse selection problem?

Solutions to Practice Problems

1. The increase in demand for good used cars shifts the demand curve rightward and with no change in supply, the price of a good car rises. At the higher price, the quantity supplied of good cars increases. With a higher price for good cars, dealers have an incentive to fix problems with lemons and offer them for sale with a warranty as good cars, so the supply of lemons decreases (lemons and good cars are substitutes in production—see pp. 93–94). The decrease in the supply of lemons raises their price.
2. If you sell your used car privately, you offer it without a warranty. Assuming the potential buyer doesn't know you, your car without a warranty would be perceived as a lemon. You would not be able to sell it for the price of the good car that it is. You would sell it to a dealer if he offered you more than the price of a lemon.

Solution to In the News

Colleges and students know the grades and test scores, so these are not private information. "Students have become less authentic to themselves" indicates that students try to present themselves as better than they are. The student's true self is private information. Schools try to draw more applicants by looking like comfortable, friendly, and relaxed places. The true quality of the school is the school's private information. With both schools and hopefuls having private information, adverse selection occurs in the market for college places and the best match isn't always achieved.