Chapter 23: Asymmetric Information

Outline and Conceptual Inquiries

Understanding Adverse Selection
- Lemons Market: Used Cars
  Should you purchase a used vehicle?
  Application: Commercial Real Estate Leasing

Finding Second-Best Mechanism Designs
- Is a salesperson’s advice valuable?
  Application: The GED Signal
  Is it efficient to screen before purchasing?

What are Principal-Agent Models?
- Pareto Efficiency with No Moral Hazard: Nineteen Eighty-Four

Insurance and Moral Hazard
- Why can’t you insure your car for 100% of a loss?

Employer and Employee Relations
- When the cats away, will the mice play?
  Application: The Incorruptible Cashier

Inefficiency with Moral Hazard
- Why fast-food outlets are independently owned and operated?
  Application: Sharecropping
  Why does an accused felon not flee?
  Why are some interns not paid or paid a low wage?

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Summary

1. Asymmetric information exists when market information is costly and varies between buyers and sellers. This asymmetric information generates two types of outcomes: adverse selection and moral hazard.

2. Adverse selection exists when an informed agent’s decision depends on unobservable characteristics that adversely affect uninformed agents.

3. Adverse selection results in an inefficient allocation (called the lemons problem), where only a market for the lowest quality group of commodities prevails, with missing markets for higher-quality commodities.

4. Pooling all consumers together is one mechanism for addressing the inefficiencies associated with adverse selection in health insurance. Rates are set at the average cost of health care and adverse selection is eliminated by requiring all consumers to participate.

5. A mechanism provided by firms that transfers information from the informed agent to the uninformed agent is called signaling. Firms may employ strong signals such as reputation, guarantees, warranties, and standardized products to create a market for their level of quality products.

6. A mechanism employed for sorting the commodities offered by sellers is called screening. By screening commodities in terms of characteristics, a market for alternative characteristics can develop.

7. Moral hazard may exist when future returns of an agent are dependent on the actions of another agent. An example is an employer unable to observe an employee’s work ethic.

8. In the insurance market, the optimal level of precaution for a consumer is to equate the marginal cost with the marginal benefits of precaution. Assuming no moral hazard, an actuarially fair insurance policy will result in this optimal level of precaution.

9. Moral hazard will result in insurance companies being unable to cover all the claims from their premiums unless mechanisms are designed that provide incentives for consumers to take precaution. Coinsurance and deductibles are mechanisms designed by insurance companies to encourage consumers to take some level of precaution.

10. A particular form of moral hazard is called shirking, where an employee engages in leisure while working. An employee’s level of effort depends on her participation constraint, where the employee will be willing to work if the payoff is at least as great as the next highest payoff.

11. An employer can increase an employee’s effort by offering a compensation scheme, called an incentive-compatibility constraint, which gives the employee an incentive to choose the required effort level.
12. Residual claimant, contingent contract, and bonding are mechanism designs that consider employees’ incentive-compatibility constraints.

**Key Concepts**

adverse selection  
asymmetric information  
employee buyouts  
hidden actions  
hidden information  
moral hazard

principal  
principal–agent problem  
residual claimant  
screening  
shirking  
signaling

**Key Equations**

\[ TC'(P) = -EI'(P) \]

A condition for Pareto efficiency with no moral hazard is equating the marginal cost of precaution to the marginal benefit of reducing expected losses.

\[ TC'(P) = -A'(P) \]

A condition for Pareto efficiency with an insurance market and no moral hazard is equating the marginal cost of precaution to the additional savings in premium costs.

\[ -0.2EI'(P) = TC'(P) \]

With moral hazard and given a 20 percent coinsurance, the second-best Pareto efficient equilibrium level of precaution is where 20 percent of the marginal benefit of reducing expected losses is equal to the marginal cost of precaution.
TEST YOURSELF

Multiple Choice

1. Markets with hidden information often result in
   a. Pareto-inefficient allocations
   b. Moral hazard
   c. Adverse selection
   d. All of the above.

2. The lemons problem suggest that
   a. Buyers will expect reliable used cars
   b. The used car market will consist only of lemons
   c. The price paid for a lemon will be higher than for a reliable car
   d. Sellers of used cars often do not know their value.

3. Compared with a market with perfect information, the market for used cars results in a
   a. Higher price for used cars
   b. Missing market for lemons
   c. Greater proportion of reliable cars sold
   d. Greater proportion of lemons sold.

4. A product warranty is an example of a
   a. Screen
   b. Mechanism design to reduce moral hazard
   c. Signal
   d. Principal–agent mechanism design.

5. To reduce the problems associated with adverse selection, the seller may use ______, while
   the buyer may use ______.
   a. Screening; signaling
   b. Signaling; screening
   c. A deductible; coinsurance
   d. Inspections; warranty.

6. A signal results in only a second-best Pareto-efficient outcome because
   a. Unlike the price signal, buyers may not receive the signal
   b. There is an expense associated with using a signal
   c. Unlike the price signal, signals are unreliable
   d. This statement if false all signals are Pareto-efficient.

7. The majority of the signal cost will be borne by
   a. Sellers if demand is relatively more inelastic than supply
   b. Buyers if demand is relatively more inelastic than supply
   c. Sellers and buyers equally
   d. Buyers if demand is relatively more elastic than supply.
8. Erica and Andy rent an apartment from Mark, who does not charge them a damage deposit. In this instance, ______ is (are) the principal(s), while ______ is (are) the agent(s).
   a. Erica and Andy; Mark
   b. Mark; Erica and Andy
   c. Nobody; all three
   d. None of the above.

9. Refer to Question 8. Erica and Andy may not take as much care as they would if they owned the property. This situation is known as
   a. Moral hazard
   b. Adverse selection
   c. Hidden information
   d. All of the above.

10. With no moral hazard, the optimal level of precaution occurs where
    a. $\text{MC}(P) = \text{EL}'(P)$
    b. $\text{MC}(P) = 0$
    c. $\text{MC}(P) = -\text{EL}'(P)$
    d. $\text{EL}'(P) = 0$.

11. Coinsurance
    a. Reduces the amount of moral hazard
    b. Results in the agent having to pay a portion of the loss
    c. Increases the consumer’s optimal level of precaution
    d. All of the above.

12. Which is not an example of moral hazard?
    a. With limited monitoring, an employee shirks
    b. An insured driver exceeds the speed limit
    c. A renter chooses to leave his apartment unlocked
    d. A business owner pays his employees below-market wages.
Short Answer

1. Describe the lemons problem. Is there any way this can be overcome? Is a Pareto-efficient outcome possible in this market? Explain.
2. Comment on the statement “New employees should always start out at lower wages.”
3. Explain how the problem of adverse selection can be reduced in the market for health insurance.
4. Explain the difference between signaling and screening. Provide an example of each.
5. Suppose used car sellers offer warranties to signal they are selling a reliable car. Will this lead to a Pareto-efficient outcome? If not, who bears the deadweight loss?
6. What is meant by a principal–agent problem?
7. Tim and Karen run a small restaurant. As with any restaurant, they run a risk of loss due to small kitchen fires. This risk can be mitigated somewhat by taking precautions such as purchasing fire extinguishers or increasing the training and awareness of employees. Assuming no moral hazard exists, illustrate graphically the Pareto-efficient level of precaution. Explain why the curves have the shapes that they do and explain the optimizing condition.
8. Why do health insurance companies often use deductibles and coinsurance?
9. Comment on the statement “As long as moral hazard exists, there will be a deadweight loss.”
10. The employment relationship can also be described as a principal–agent problem. Explain. Are there any ways for firms to overcome this moral hazard problem?
Problems

1. Suppose there are two types of used flat screens on the market (good and bad). The demand and supply of each are

\[ G^D = 520 - 10p_g, \quad G^s = p_g - 30, \]
\[ B^D = 135 - 8p_b, \quad B^s = 2p_b - 5. \]

a. Suppose there is perfect information about the quality of each screen available for sale. What will be the price and quantity sold of each type?
b. Suppose buyers cannot tell the quality of the used screens. What will be the equilibrium price and quantity sold of each screen type?

2. Refer to Problem 1. Assume sellers of good screens can signal their quality at a cost of $1 per screen sold.
a. How many screens will be sold in each market and at what prices?
b. What is the deadweight loss cause by the asymmetric information problem? Who bears the burden of this loss? What does this imply about the relative elasticities of supply and demand for good screens?

3. Refer to Problem 1. Assume that buyers of flat screens can screen the screens at a cost of $1 per screen sold.
a. How many screens will be sold in each market and at what price?
b. What is the deadweight loss cause by the asymmetric information problem? Who bears the burden of this loss?

4. Tim and Karen run a small restaurant. As with any restaurant, they run a risk of loss due to small kitchen fires. This risk can be mitigated somewhat by taking precautions such as purchasing fire extinguishers or by increasing the training and awareness of employees. Assume that the total cost of precaution \( P \) can be represented by \( TC(P) = 100P - P^2 + \frac{1}{2}P^3 \) and that the expected loss is \( EL(P) = 2000 - 100P - 2P^2. \)
a. If there is no moral hazard, what is the efficient level of precaution?
b. If Tim and Karen have an actuarially fair insurance policy and there is moral hazard, what level of precaution will prevail?