

# 16

## CHAPTER 16

# Asymmetric Information

*When one party to a deal knows something the other does not, and what markets do about it.*

# What this chapter covers



## 16.2–16.4 Hidden type

- The market for lemons
- Adverse selection in insurance
- Signaling & screening



## 16.5–16.6 Hidden action

- Moral hazard
- The principal-agent problem
- Incentive contracts & regulation



## 16.7–16.8 Evidence

- Case: online platforms
- Empirical: RAND experiment
- Reputation systems at work

### THE BIG IDEA

Asymmetric information is so central that the three economists who first analyzed it, Akerlof, Spence, and Stiglitz, shared the 2001 Nobel Prize.

# 16.1

## Introduction

- Two forms: hidden type vs. hidden action
- Adverse selection and its cures
- Moral hazard and its cures

# Three everyday puzzles



## Used cars

Why pay full price when the seller is likelier unloading a dud than a gem?



## Insurance

Why does a healthy young person skip coverage, leaving a sicker, costlier pool?



## Online sellers

Why does a seller with thousands of good reviews fetch a higher price?

## THE NEW ASSUMPTION

In every market so far, buyers and sellers knew what they were trading. This chapter drops that assumption: one party knows something the other does not.

# Two forms of asymmetric information

## ■ Adverse selection, a hidden TYPE

Something known before the deal: the quality of a car, the health of an applicant. The cure is to reveal it through signaling and screening.

## ■ Moral hazard, a hidden ACTION

Something done after the deal: how carefully the insured behaves, how hard an employee works. The cure is to design contracts that restore incentives.

# 16.2

## The Market for Lemons

*Akerlof (1970): how hidden quality unravels a market.*

# Akerlof's used-car example

THE SETUP

Half of all used cars are good, half are lemons.  
Only the seller knows which kind a given car is,  
the buyer cannot tell them apart.

| Car      | Worth to owner | Worth to buyer |
|----------|----------------|----------------|
| Good car | \$10,000       | \$12,000       |
| Lemon    | \$4,000        | \$5,000        |

Values in the market for lemons.

A “lemon” is the slang term for a bad car.

## 16.2 THE MARKET FOR LEMONS

# The unraveling, step by step

- A buyer who cannot tell them apart pays at most the average value:  $\frac{1}{2}(\$12,000) + \frac{1}{2}(\$5,000) = \$8,500$ .
- But at \$8,500 the owner of a good car (who values it at \$10,000) refuses to sell, only lemon owners are willing.
- Realizing any car offered at \$8,500 must be a lemon, buyers will pay only \$5,000.
- Good cars are driven out of the market entirely.

# This is adverse selection

## ■ Adverse selection

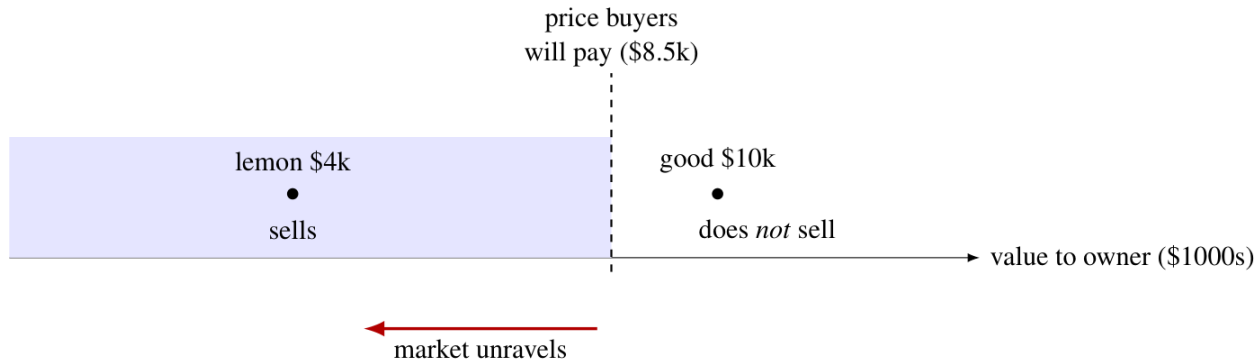
Because the hidden quality is correlated with who chooses to sell, the bad drives out the good, and mutually beneficial trades in good cars never happen.

## WHY IT MATTERS

The good cars are worth more to buyers than to owners, yet they never trade. Hidden information destroys gains both sides would have shared.

## 16.2 THE MARKET FOR LEMONS

# The market unravels



- Each price drop pushes out the next tier of good cars.
- What remains is worse, so the price falls again.
- The market collapses toward lemons only.

Figure 16.1 As the price falls, good cars withdraw, leaving only lemons.

# Check your understanding

## SELF-CHECK

Buyers cannot tell good used cars (worth \$8,000) from lemons (worth \$2,000) and believe half are each, so they offer \$5,000. What happens to the good cars, and what is this called?

Owners of good cars will not sell for \$5,000, so they withdraw; only lemons remain and the price falls further. Hidden quality drives the good cars out of the market, adverse selection, the lemons problem.

# 16.3

## Adverse Selection in Insurance

*The same logic, with the roles reversed.*

### 16.3 ADVERSE SELECTION IN INSURANCE

## Now the buyer holds the hidden information

- People who know they are high-risk, in poor health, or reckless drivers, are the most eager to buy insurance.
- The healthy and careful are tempted to go without.
- An insurer setting premiums for the average customer attracts a worse-than-average pool.
- Premiums rise, the lowest-risk customers drop out, and the pool worsens again.

# Why insurers do what they do



## Screen applicants

Medical questionnaires and driving records reveal hidden risk.



## Tie to employment

Group plans capture healthy and sick workers together.



## Require everyone in

Some health systems mandate buy-in so the healthy cannot opt out.

### THE COMMON THREAD

Each device fights the same problem: stop the healthy from opting out and leaving only the costly behind.

# The same mechanism everywhere



## Credit markets

Borrowers willing to accept very high rates are often the riskiest, so banks ration credit and demand collateral.



## Labor markets

At a fixed wage, those most likely to accept may have the fewest options, so firms screen with interviews and probation.



## Company shares

Sellers may know more about a firm's prospects, so buyers discount what they will pay.

## AKERLOF'S LOGIC

In every case the mechanism is Akerlof's: hidden quality, correlated with who participates, drives the bad out the good.

# 16.4

## Signaling and Screening

- Signaling: the informed party reveals its type
- Screening: the uninformed party draws it out
- What makes a signal credible

# If hidden information is the problem, revealing it is the cure

### ■ Signaling, the INFORMED party reveals its type

A worker earns a degree as a signal of ability, credible because it is easier for able workers to obtain (Spence). A long warranty signals reliability, since it would be ruinously expensive on a shoddy good.

### ■ Screening, the UNINFORMED party draws it out

An insurer offers a menu of policies, knowing high-risk customers choose fuller coverage; a lender requires collateral that only serious borrowers will post.

# A signal must be one the bad type cannot imitate

## THE KEY PRINCIPLE

The signal must be costlier for the low type than for the high type. Otherwise everyone would send it and it would reveal nothing.

- A college degree signals ability because it is genuinely harder, and costlier, for a less able student to earn.
- A long warranty signals reliability because it would bankrupt a shoddy maker but costs a quality maker little.
- Heavy spending on a headquarters or advertising signals a firm expects to be around to recoup it.

#### 16.4.1 WHAT MAKES A SIGNAL CREDIBLE

## Why firms “waste” money on signals

### SPENCE'S PRINCIPLE

Credible signals are costly in a way that separates the types, cheap talk that anyone could mimic conveys nothing.

*This explains why a money-back guarantee reassures a wary buyer, and why elaborate signals are not really wasteful.*

# 16.5

## Moral Hazard

*Hidden actions taken after a deal is struck.*

# Hidden actions, not hidden types

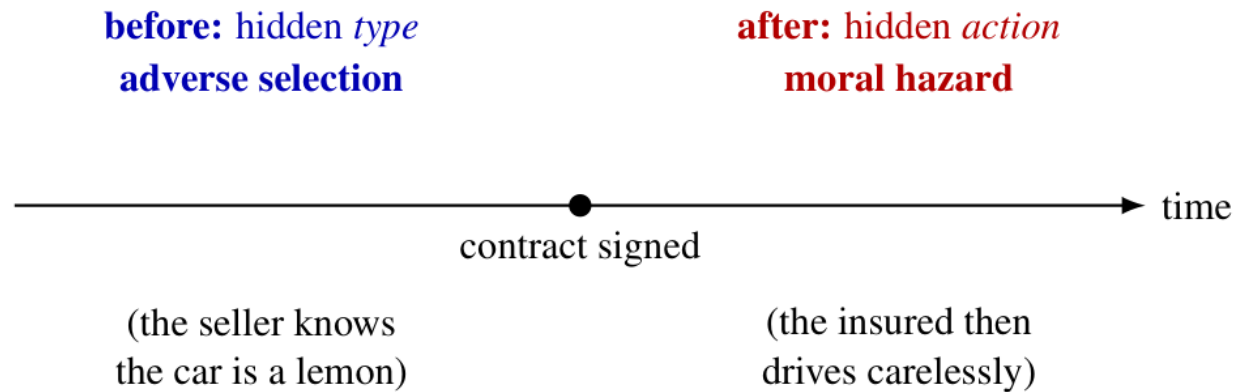
## ■ Moral hazard

The second problem concerns hidden actions taken after a deal is struck. Insurance is again the leading case.

- A person with full fire insurance has less incentive to install smoke detectors.
- A driver with full collision coverage may park less carefully.
- A patient whose insurer pays every bill has little reason to weigh whether a test is worth its cost.

## 16.5 MORAL HAZARD

# Timing tells the two problems apart



**Adverse selection** A hidden type, known before the contract.

**Moral hazard** A hidden action, taken after the contract.

Figure 16.2 Adverse selection: hidden info before the contract. Moral hazard: hidden action after.

# Coverage dulls the incentive to take care

## THE MECHANISM

The insured does not become reckless on purpose, but coverage dulls the incentive to take costly care, so insured losses run higher than they otherwise would.

*Because the insurer cannot observe how careful each customer is, it cannot forbid carelessness, it must restore incentive through the contract.*

# 16.6

## The Principal-Agent Problem

- When a principal cannot observe an agent's action
- Skin in the game through the contract
- The trade-off in incentive contracts

# Moral hazard is one instance of a broader problem

## ■ The principal-agent problem

A principal (insurer, employer, shareholder) cannot fully observe the action of an agent (the insured, an employee, a manager) whose interests differ from its own.

## THE SOLUTION

The solution: write a contract that ties the agent's reward to an observable outcome, giving the agent “skin in the game.”

## Two ways to give agents skin in the game



### Deductibles & co-payments

The customer bears part of any loss and keeps an incentive for care.



### Performance pay

Commissions, bonuses, and stock mean workers gain when the firm does.

### THE CATCH

Every such contract trades off two goods: stronger incentives push the agent to act well but also load more risk onto her.

# Every contract walks a tightrope



## Stronger incentive

Tie pay tightly to results, pure commission, mostly stock, and the agent works hard, keeping the fruits of her effort.



## More risk

Results depend partly on luck, a recession, a bad year. A risk-averse agent (Ch. 7) must be paid extra to bear it.

## THE BALANCE

The best contract balances the two: enough pay-for-performance to motivate, but not so much that the agent drowns in risk she cannot manage.

### 16.6.1 THE TRADE-OFF IN INCENTIVE CONTRACTS

# Why real contracts look the way they do

- Most workers are paid mostly a fixed salary with some bonus, rather than pure piece rates.
- Insurance comes with deductibles, rather than either full coverage or none.
- Executive pay mixes salary, bonus, and stock.

#### THE BOTTOM LINE

The principal cannot observe effort directly, so she designs a contract that makes the agent want to act well, and pays, in extra compensation for risk, for the privilege.

# Regulation exists to fix these problems

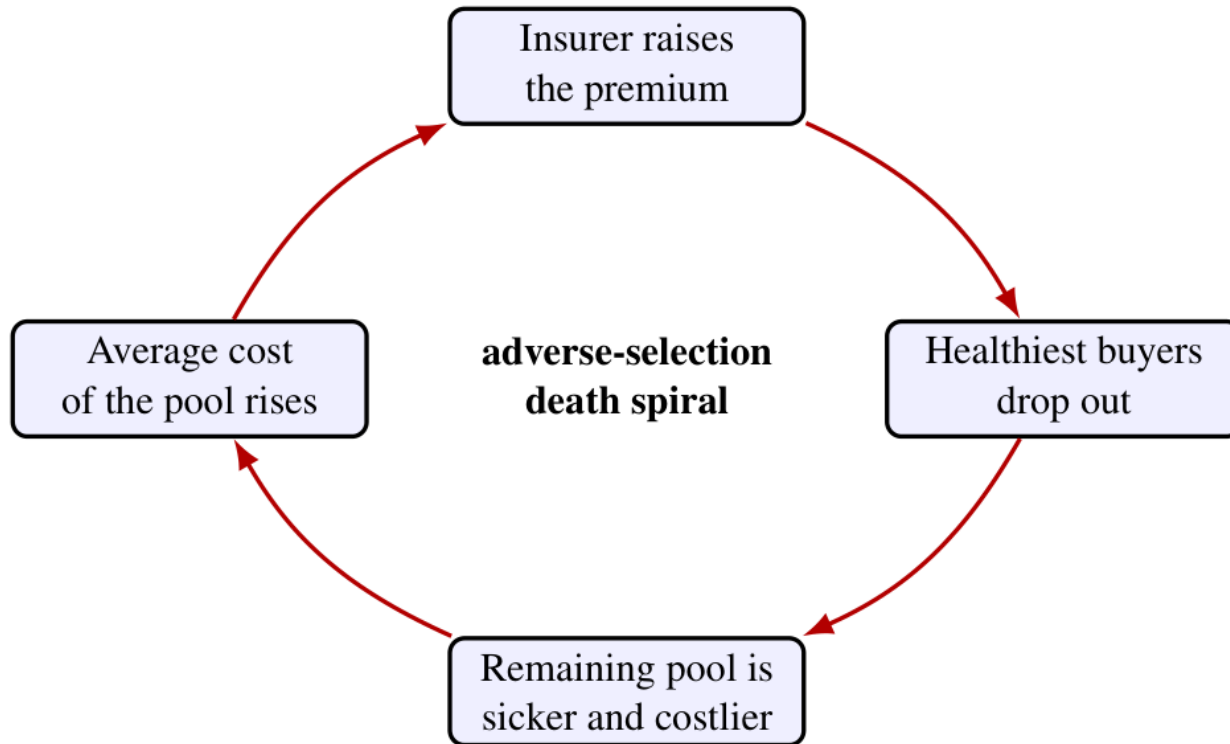
## ■ The death spiral

If premiums rise, the healthiest customers drop out first; the remaining pool is sicker and costlier; the insurer must raise premiums again, until the market threatens to collapse.

## THE CURE

The standard regulatory cure is to mandate participation, keeping the healthy in the pool.

## The adverse-selection death spiral



- The U.S. Affordable Care Act (2014) added an “individual mandate.”
- Many countries achieve the same end through universal compulsory coverage.
- Lemon laws, labeling rules, and securities disclosure attack the lemons problem directly.

Figure 16.3 The death spiral, which a mandate to participate is designed to break.

## 16.6.2 HOW REGULATION TACKLES HIDDEN INFORMATION

# A developing-country example: group lending

- Lending to the poor is crippled by asymmetric information: hidden risk, unwatchable loan use, no collateral.
- The Grameen Bank (Yunus, Bangladesh, 1970s) introduced group lending.
- Members pick trustworthy partners (peer selection) and monitor one another to repay.
- Joint liability makes each member responsible for the others' loans.

**~97%**

repayment rate achieved by  
Grameen and similar lenders

**2006**

Yunus and Grameen shared  
the Nobel Peace Prize

### THE INSIGHT

Standing in the community serves as the collateral the poor do possess, a self-enforcing contract where formal regulation is thin.

# 16.7

## Case Study: How Online Platforms Solve the Lemons Problem

*Reputation systems turn hidden quality into something observable.*

## 16.7 CASE STUDY

# The internet should be a paradise for lemons

- Buyers purchase from sellers they have never met, sight unseen, exactly the conditions of Section 16.2.
- That eBay, Airbnb, and Uber function at all is largely due to reputation systems.
- After each transaction, buyers and sellers rate one another, and ratings are public.
- This turns hidden quality into something observable, a modern form of signaling and screening.

## 16.7 CASE STUDY

# The effect is measurable

**7–8%**

price premium an eBay seller with a long positive record earns over a newcomer

**2-sided**

Airbnb and ride-hailing apps: both sides rate each other

### WHY IT WORKS

These systems do not eliminate asymmetric information, but by making reputations visible and valuable they keep the good from being driven out by the bad, allowing markets to exist where Akerlof's analysis predicts they might collapse.

# 16.8

## Empirical Evidence: The RAND Health Insurance Experiment

*How large is moral hazard in practice?*

## 16.8 EMPIRICAL EVIDENCE

# One of the most ambitious social experiments ever run

- Between 1974 and 1981, RAND randomly assigned more than 5,800 people to health plans.
- Plans ranged from completely free care to plans requiring people to pay most of their own bills up to a cap.
- Because assignment was random, any difference in care used could be attributed to the insurance itself.

**5,800+**

people randomly assigned to  
plans

**1974–81**

years the experiment ran

### WHY IT IS CLEAN

Random assignment gives a clean measure of moral hazard: the effect of the insurance, not of who chose it.

## 16.8 EMPIRICAL EVIDENCE

# The results were decisive

**+30%**

more spent on care by those given free care vs. those who shared the cost

**~0**

average health improvement from the extra care

- The extra spending came almost entirely from starting more episodes of care, the dulled incentive of Section 16.5.
- For the average participant the extra care produced little or no improvement in health.

# An important exception

## THE QUALIFICATION

The poorest and sickest patients did benefit from free care, for instance through better control of high blood pressure.

- Cost sharing curbs moral hazard, but it can also deter care that is genuinely worthwhile.
- The RAND findings still shape the deductibles and co-payments in health plans today.

# Key takeaways

1

## Two forms

Adverse selection is a hidden type before the deal; moral hazard is a hidden action after it.

2

## The lemons problem

Hidden quality, correlated with who sells, drives good cars out, Akerlof's unraveling.

3

## Adverse selection is everywhere

Insurance, credit, labor, and share markets all show it.

4

## Signaling & screening

Reveal hidden types; a credible signal is costlier for the low type than the high type.

5

## Principal-agent

Incentive contracts trade stronger motivation against more risk on a risk-averse agent.

6

## Evidence

Online reputation systems and RAND's 30% moral-hazard finding confirm the theory.