# Chapter 19

## Decisions Involving Private Information

1. Adverse Selection When Sellers Know More Than Buyers
2. Adverse Selection When Buyers Know More Than Sellers
3. Moral Hazard: The Problem of Hidden Actions

# Chapter 19 (1 of 4)

Discover how **sellers'** private information can reduce the quality of goods offered for sale and distort market outcomes:

- Lemons
- Solutions

1. Adverse Selection When Sellers Know More Than Buyers
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# When Sellers Have Private Information

**Private information:** When one party to a transaction knows something the other doesn't.

- Also referred to as *asymmetric information*.

This section focuses on situations in which **sellers know more than buyers.**

- As a buyer, you are worried you may get ripped off.

**Examples:** Buying a used car; buying health supplements; shopping on eBay; buying stock

*Let's explore how this information gap can lead to a market failure!*

# Buying a used car: Is it a lemon?

Konstantinos Moraitis/Alamy

Buying a used car is **risky** because you don't know if you're being sold a **lemon.**

- **Lemon** = junk car with many problems

The seller knows which cars in their lot are high quality and which are lemons, but buyers don't.

Since buyers **can't tell the difference** between high quality and lemons, **all cars** sell for the **same price**.

- Because of the unknown quality, the price settles **somewhere between** the buyers' willingness to pay for a lemon and their willingness to pay for a high-quality car.

*Let's discuss this pricing outcome, and see how it affects the kinds of cars that end up getting put up for sale.*

## Sellers of high-quality cars

Because buyers can't identify the true quality of the car and are wary of getting ripped off…

- High-quality cars **sell for less** than they would if buyers could discern their true quality.

**Result:** Sellers of high-quality cars may **choose to not sell.**

**Scenario:** You're moving and won't need your car in the new city. However, potential buyers offer a low price because they fear it might be a lemon.

- The small amount you'd receive from selling the car does not offset what keeping the car is worth to you. ☾ You don't sell.

# Sellers of lemons

Because buyers can't identify the true quality of the car but are hopeful that it might be high quality…

- Lemons **sell for more** than they would if buyers could discern their true quality.

**Result:** Sellers of lemons are **more likely to sell.**

The price the buyer offers you is higher than the true value of the lemon, so you sell!

**Adverse selection of sellers:** The tendency for the mix of goods to be **skewed toward more low-quality** goods when buyers can't observe

# The adverse selection of sellers

# Analyzing the used-car market (1 of 2)

Buyers' valuations:

- Willing to buy a **high-quality** car for **$14,000**, and a **lemon** for **$1,500**.

Buyers don't know the true quality, so they focus on the **average value** of used cars (assume risk-neutral).

- If **40%** of used cars offered are **lemons**…
- Value to the buyer of used car on average = **40%** × **$1,500** + **60%** × **$14,000** = **$9,000**.

Assume 100 sellers:

- **40** have lemons which they'd sell for $1,000 → Will offer their car for sale.
- **20** have high-quality which they'd sell for $7,000 → Will offer their car for sale.
- **40** have high-quality which they'd sell for $10,000 → Will **NOT** offer their car for sale.

Of the cars being offered for sale, **two-thirds** are lemons: **40**/(**40**+**20**) = 66.67%

# Analyzing the used-car market (2 of 2)

Of the cars being offered for sale, **two-thirds** are lemons: **40**/(**40**+**20**) = 66.67%

Buyers respond with an updated willingness to pay:

- If **66.67%** of used cars offered are **lemons**…
- Value to the buyer of used car on average = **66.67%** × **$1,500** + **33.33%** × **$14,000** = **$5,666.25**

Of the 60 sellers:

- **40** have lemons which they'd sell for $1,000 → Will offer their car for sale.
- **20** have high-quality which they'd sell for $7,000 → Will **NOT** offer their car for sale.

**Result**: Only sellers of lemons will offer their car for sale.

Buyers' response to 100% lemons: **100%** × **$1,500** + **0%** × **$14,000** = **$1,500**

The large number of lemons **drives all high-quality cars out of the market!**

# Solutions to adverse selection of sellers (1 of 2)

**Big Picture Goal:** Bridge the information gap between buyers and sellers to minimize potential mistrust.

**1. Buyers can learn from third-party verifiers.**

- Help buyers learn about the quality of products.

**2. Sellers can signal their product's quality.**

- **Signal:** An action taken to credibly convey private information.
- *Credible signals* must be too costly for low-quality sellers to send, such that only

**Third-party verifiers:**

Consumer reports, Yelp and other customer reviews, Carfax, get a mechanic to inspect a car before buying it.

**Signals:**

**Earning a degree** signals to potential employers that you are capable and tenacious.

**Product warranty** signals to potential buyers the true quality of the product.

Showing you the **maintenance records** signals a car is *not* a lemon.

# Solutions to adverse selection of sellers (2 of 2)

**Big Picture Goal:** Bridge the information gap between buyers and sellers to minimize potential mistrust.

1. Buyers can learn from third-party verifiers.

2. Sellers can signal their product's quality.

**3. Government can increase information or weed out low-quality goods.**

- Force sellers to reveal private information.
- Outlaw the lowest-quality product.

**The law requires…**

Homeowners to disclose any information that might affect a buyer's willingness to pay:

Does the house have asbestos?

**Eliminate low-quality sellers:**

Doctors need **an occupational license** to practice medicine.

The **FDA** sets a minimum standard for food and drug products.

# Key take-aways: Adverse selection when sellers know more than buyers

## Adverse selection of sellers

- The tendency for the mix of goods to be **skewed** toward more **low-quality** goods when buyers can't observe quality.


## Solutions:

1. Improve information via third-party verifiers.
2. Signal the quality.
3. Government: increase information and weed out low-quality.

# Chapter 19 (2 of 4)

Discover how **buyers'** private information can drive up sellers' costs and distort market outcomes:

- Risk of Getting High-Cost Customers
- Solutions

1. Adverse Selection When Sellers Know More Than Buyers
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# When Buyers Have Private Information

**Adverse selection of buyers:** The tendency for the **mix of buyers** to be **skewed** toward more **high-cost buyers** when sellers don't know the buyer's type.

When buyers know more than sellers:

- **Buyers know** that whether they are a low-cost or high-cost customers.
- **Sellers can't tell the differences** and are **worried** they'll end up with lots of high-cost customers.

**Health insurance example:**

- Health insurance companies **want healthy customers** (low-cost customers).
- But companies don't know how healthy their customers are (only customers have this information)

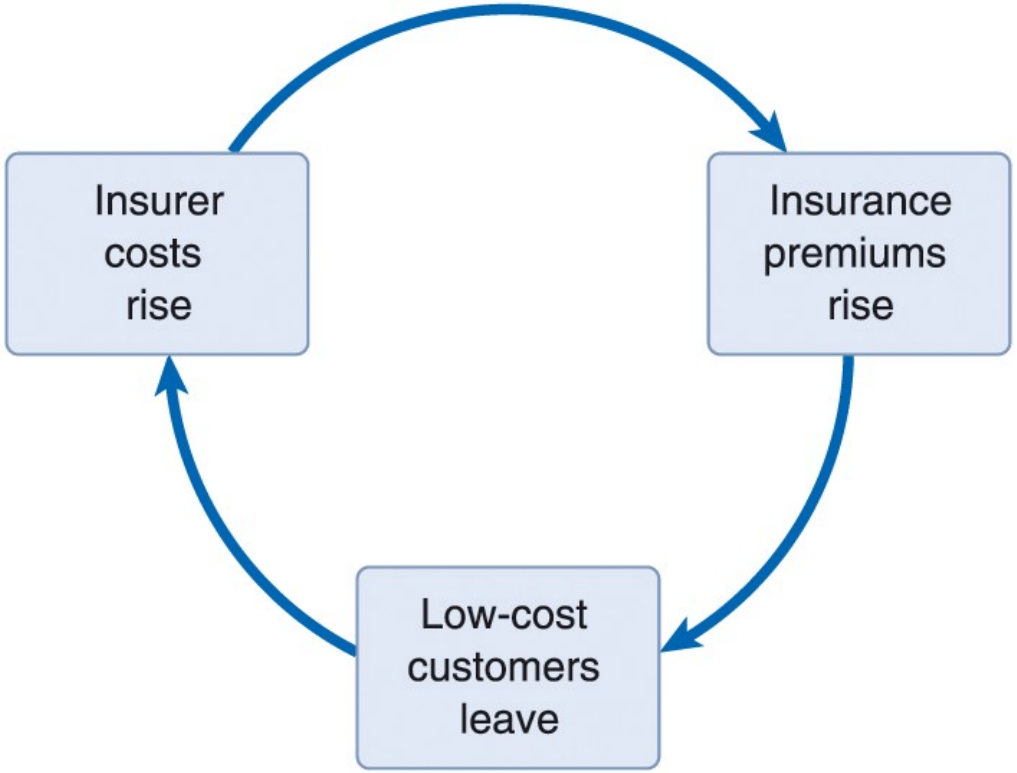
# Adverse selection of buyers (1 of 3)

Insurance companies **can't differentiate** between types of customers, so…

- charge everyone the **same price.**
  - **somewhere between** what it would cost the seller to insure a low-cost and a high-cost customer.

<u>Low-cost customers' view</u>: too expensive; don't buy.

<u>High-cost customers' view</u>: great deal!; buy it!




This adverse selection of buyers **increases the cost** of ensuring customers, **pushing prices up**.

# Adverse Selection of Buyers (2 of 3)

Shared ignorance is bliss

Insurance works best when neither side knows how likely it is that the insured event will happen.

- **Homeowner's insurance:** neither the buyer nor the seller has private information regarding the likelihood of a flood or tornado or fire.
  - No opportunity for buyers (or sellers) to use private information to their advantage.

Letting people opt back into insurance when they need it worsens adverse selection.

Potential customer strategy: **Opt out** when healthy, and **opt back in** as soon as you get sick.

- That's not *insurance,* that's a *bailout.*
- Ongoing debate about insurance mandates, and how to deal with preexisting conditions.

# Adverse Selection of Buyers (3 of 3)

Risk aversion may help undo some of the problems of adverse selection.

People who **dislike risk** (don't like to take gambles) are called **risk averse**.

- They dislike uncertainty enough to pay to avoid it.

Risk-averse people will **pay more** than the *actuarially fair* price for insurance.

- **Actuarially fair:** An insurance policy that, on average, is expected to **pay out as much** in compensation **as it receives** in premiums.

How risk-averse people help mitigate adverse selection:

- They are willing to **pay more than their actual need**, and so their presence in the insurance market lowers costs on average.

# Additional Examples of Adverse Selection of Buyers

**The big-picture problem:** Your business struggles to get the customers you want.

Examples:

- **Life insurance** companies get customers who don't take good care of their health.
- **Car insurance** companies get people who are bad drivers.
- **Divorce insurance** companies get people whose marriages are struggling.
- **Landlords** get people who would rather rent than buy because the person is not interested in taking good care of their living space.
- Restaurants with **all-you-can-eat buffets** get people with really large appetites.

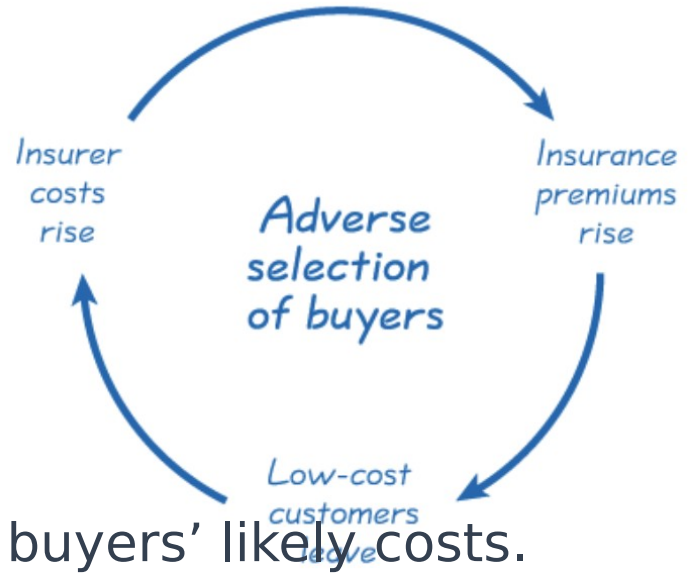
# Solutions to Adverse Selection of Buyers

1. Sellers can use **information** that is related to buyers' likely costs.
   - Auto insurers use age, gender, marital status, driving record, etc.
2. Sellers can offer **different contracts** so that buyers **sort themselves.**
   - High versus low deductible insurance plans.
3. **Government** can increase information or directly reduce adverse selection.
   - **Incentivizes** buyers to reveal private information ☾ insurance fraud is a crime.
   - **Subsidize** insurance ☾ government covers part of the cost of health insurance for you!
   - Can **require** everyone to buy insurance ☾ eliminates adverse selection.
   - Can **provide** insurance ☾ Medicare and Medicaid covers two-fifths of all Americans.

# Key take-aways:
# Adverse selection when buyers know more than sellers

## Adverse selection of buyers

- When buyers have private information, the adverse selection spiral raises the price for low-cost buyers, causing some to leave the market.



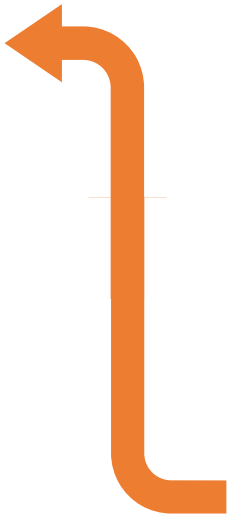

## Solutions:

1. Sellers can use information related to buyers' likely costs.
2. Sellers can offer different contract.
3. Government: increase information and directly reduce adverse selection.

# Chapter 19 (3 of 4)

Recognize and solve problems that arise when some actions are hidden:

- Moral Hazard
- Solutions



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3. Moral Hazard: The Problem of Hidden Actions

# Moral Hazard Arises from Hidden Actions

**Moral hazard:** The actions you take because they are **not fully observable,** and you are **partially insulated** from their consequences.

**Example: Slacking off at work**

- Your boss doesn't know how much effort you're putting in (that's your private information).
- If you get paid the same amount either way, there's no reason to work harder.

**Key problem:** Moral hazard can lead to **wasteful** and **risky choices.**

## “Not fully observable”

You make **different choices** when your actions **aren’t observable.**

Car insurance example:

Were you tailgating? Speeding? Texting?

Your **auto insurer doesn’t know** (that’s your private information).

- If they *could* observe your actions, then they might only agree to insure you if you drive carefully.

But **they pay regardless** of reckless driving.

- **Result: You take fewer precautions** than if you weren’t insured.

## “Partially insulated”

You make **different choices** when the marginal benefits or costs from your actions are **shared**.

Car insurance example:

If you get into a car crash, you don’t bear the full consequences.

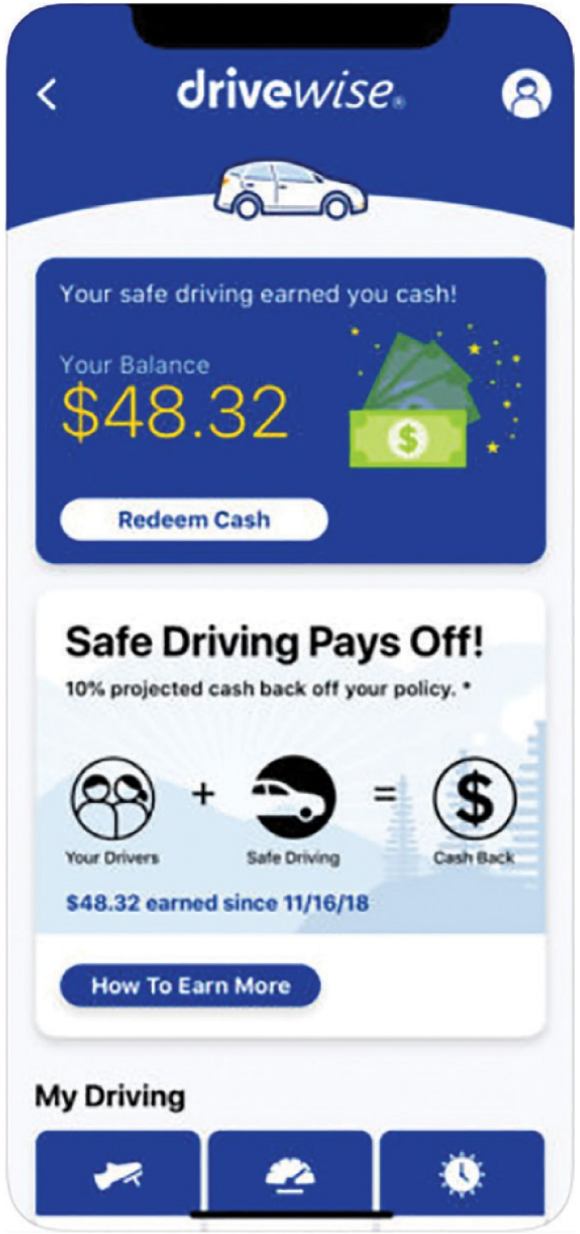
- Some of the repair costs are paid by the insurance company.
- **Result:** Insurance leads you to take **fewer precautions**.

# Insurance and monitored driving

When insurance companies can **monitor your driving**, they can...

1. Better **separate good** and **bad** drivers.
   - Tailor the price of insurance for each driver.
2. **Incentivizes you** to drive more carefully.
   - Good driving lowers the price of your insurance.

Monitoring technology transformed **hidden actions** (your efforts to drive safely) **into observable actions.**



# Moral hazard can cause markets to collapse

Once you insure against a bad thing, that bad thing becomes **more likely to happen.**

- Why?
- Because you don't have the incentive to be as careful when you are insured.

<u>Auto insurance example:</u>

- Get insurance.
- Drive less carefully.
- More likely to get into a fender bender.
- Raises the cost of providing

# Key Definition

**Principal-agent problem:** The problems that arise when a **principal** hires an **agent** to do something on their behalf, but the principal cannot perfectly observe the agent's actions.

Moral hazard changes the relationship when *information* and *incentives* differ.

- If you hire someone to do a job, but you **can't see** what they actually do, they have an incentive to **underdeliver**.

## Diving into the Definition

**Mechanic example:** You hire a mechanic to repair your car.

Information gap:

You leave your car at their garage.

- You don't really know what they do.
- The mechanic's actions are **private.**

Incentives differ:

- You don't want to pay a lot, but the mechanic wants to earn a lot.

**Problem:** They might recommend

# Examples of Moral Hazard Problems

**Shareholders and CEOs**

- Shareholders hire CEOs to run the business efficiently and profitably.
- **Problem:** Shareholders can't assess whether it's a vanity project or a sound investment.

**Customers and restaurants**

- Customers buy meals from restaurants.
- **Problem:** Customers can't observe how much salt or butter is being used and restaurants don't bear the health consequences.

**Buyers and real estate agents**

- People looking to buy a house hire real estate agents to assist in the search.
- **Problem:** Buyers want a house that fits their budget, but the agent's commission is larger if you end up buying a more expensive house, so they may present you with more expensive options.

# Solving Moral Hazard Problems

Solutions:

1. Make hidden actions observable by monitoring.
2. Reward things that go along with the actions you want.
3. Give the actor “skin in the game,” or a stake in the outcome.
4. Government rules and social norms can help align incentives.
5. Pick the right kind of agents.

With monitoring, or occasional monitoring, the agent’s actions that were **previously hidden are now observable** by the principal.

**Examples:**

- Employers monitor the websites their staff visit.
- GPS chips allow dog owners to ensure their dog really does get walked.
- IRS audits people’s tax returns.

# How hygiene grade cards improve food safety

Each year one out of six American gets sick from foodborne illness. Restaurants can **prevent these illnesses** by taking actions such as…

- Storing food at safe temperatures; washing hands; keeping surfaces clean…

But these actions are **hard** for customers **to observe.**

- Can’t inspect the kitchen themselves before eating.

**Solution:** Make restaurants’ actions observable to customers by requiring restaurants to **post hygiene cards** on their windows.


James Leynse/Getty Images

# Solving Moral Hazard Problems (1 of 4)

Solutions:

1. Make hidden actions observable by monitoring.
2. Reward things that go along with the actions you want.
3. Give the actor “skin in the game,” or a stake in the outcome.
4. Government rules and social norms can help align incentives.
5. Pick the right kind of agents.

Provide **complements** that go with the actions you want.

**Examples:**

- Health insurance companies offer discounts for gym memberships.
- Auto insurance provides discounts for taking auto safety courses.
- Employers provide free coffee to keep their staff alert.

# Solving Moral Hazard Problems (2 of 4)

Solutions:

1. Make hidden actions observable by monitoring.
2. Reward things that go along with the actions you want.
3. Give the actor "skin in the game," or a stake in the outcome.
4. Government rules and social norms can help align incentives.
5. Pick the right kind of agents.

If the agent shares in some of the risk (or reward), then the agent's incentives may better align with those of the principal.

**Examples:**

- **Security deposits** incentive renters to be more careful with the landlord's apartment.
- Health insurance **copays** incentivize people not to undertake unnecessary medical care.
- **Pay-for-performance:** Linking the income your workers earn to measures of their performance.
  - **Be careful** not to distort incentives!
  - Wells Fargo

# Solving Moral Hazard Problems (3 of 4)

Solutions:

1. Make hidden actions observable by monitoring.
2. Reward things that go along with the actions you want.
3. Give the actor "skin in the game," or a stake in the outcome.
4. Government rules and social norms can help align incentives.
5. Pick the right kind of agents.

Government **laws and regulations** can help reduce moral hazard.

**Examples:**

- It is **illegal** to steal or act in a fraudulent manner.
- Food and Drug Administration requires products meet certain **safety standards**.
  - You can trust that a 200 mg pill of ibuprofen actually contains 200 mg of ibuprofen.

**Social norms:**

- Honesty is a virtue; do the right thing.

# Solving Moral Hazard Problems (4 of 4)

Solutions:

1. Make hidden actions observable by monitoring.
2. Reward things that go along with the actions you want.
3. Give the actor “skin in the game,” or a stake in the outcome.
4. Government rules and social norms can help align incentives.
5. Pick the right kind of agents.

Try to do business only with people who **won’t exploit** their informational advantage.

- People who are more likely to be **honest** and **trustworthy**
- People within your **personal network**
- People invested in their **reputation**
- People with **intrinsic motivation**

# Key take-aways:
# Moral hazard: The problem of hidden actions

## Moral hazard

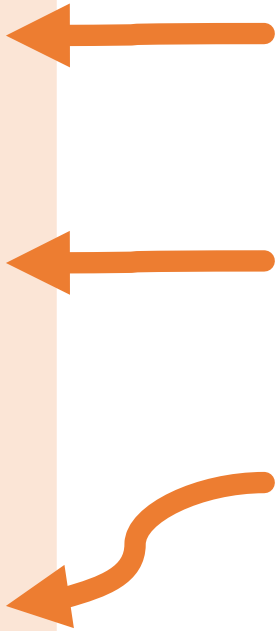
- The actions you take because they are not fully observable, and you are partially insulated from their consequences.


## Solutions:

1. Monitoring
2. Provide complements
3. Skin the game
4. Government rules and social norms
5. Pick the right kind of agents.

# Chapter 19 (4 of 4)

1. Problems arise because buyers don't know the quality of goods (used-car market).
2. Problems arise because sellers don't know how much their buyers will cost them (insurance market).
3. Problems arise because the principal doesn't know whether the agent will make unhelpful choices (slacking off at work).



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