N. GREGORY MANKIW **NINTH EDITION**
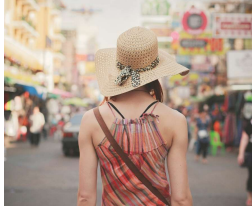
PRINCIPLES OF
ECONOMICS

CHAPTER
22

Frontiers of Microeconomics

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IN THIS CHAPTER

- How does asymmetric information affect market outcomes?
- How can market participants reduce the resulting problems?
- Why might democratic voting systems fail to represent the preferences of society?
- Why do people not always behave as rational maximizers?

Introduction

Economists are always looking for new areas to study and new phenomena to explain.

- Three topics on understanding human behavior and society:
  - Asymmetric Information: how imbalance in information affects choices
  - Political Economy: using the tools of economics to understand how government works
  - Behavioral Economics: insights from psychology into the study of economic issues

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Asymmetric Information

- Information asymmetry:
  - A difference in access to knowledge that is relevant to an interaction
  - Hidden actions
    - One person knows more than another about an action he or she is taking.
  - Hidden characteristics
    - One person knows more than another about the attributes of a good he is selling.

Hidden Actions

- Moral hazard: tendency of a person who is imperfectly monitored to engage in dishonest or otherwise undesirable behavior
  - Arises when one person (the agent) performs some task on behalf of another person (the principal)
  - Principal-agent problem: the principal cannot perfectly monitor the agent's behavior, so the agent tends to undertake less effort than the principal considers desirable

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EXAMPLE 1: Moral Hazard

How can each of the following lead to a moral hazard problem?

A. The employee – employer relationship.
- Unmonitored, workers are browsing social media while on the clock.

B. Homeowner with a good home insurance policy.
- Someone whose property is insured may not try as hard to protect it from theft/damage.

C. Hiring a babysitter.
- While the parents are out, the babysitter may spend more time texting than watching the kids.

How Principals May Respond

- Better monitoring
  - Hidden cameras to increase the chance of detecting undesirable behavior
- Higher wages
  - Efficiency wages to increase the penalty for being caught shirking
- Delayed payment
  - Firms delay payment (e.g., year-end bonuses) to increase the penalty for being caught shirking
- Government regulation

Hidden Characteristics

- Adverse selection
  - The tendency for the mix of unobserved attributes to become undesirable from the standpoint of an uninformed party
  - Arises when the seller knows more than the buyer about the good being sold
    - The buyer runs the risk of being sold a good of low quality

EXAMPLE 2: The Lemons Problem

Explain how adverse selection appears in the market for used cars.

- The seller knows more than the buyer about the quality of the car being sold.
- Owners of "lemons" are more likely to put their vehicles up for sale.
- Owners of good used cars are less likely to get a fair price, so may not bother trying to sell.
- Many people avoid buying vehicles in the used car market.

EXAMPLE 3: Health Insurance

Explain how adverse selection appears in the market for health insurance.

- Buyers of health insurance know more about their health than health insurance companies.
- People with hidden health problems have more incentive to buy insurance policies.
- So, prices of policies reflect the costs of a sicker-than-average person.
- These prices discourage healthy people from buying insurance.

Market Responses to Asymmetric Info.

- The Market Itself is a response to hidden characteristics of buyers/sellers (asym. info!)
  - Competition results in a market price
  - Buyers with values above this price would buy
  - Sellers with costs below this price would sell
  - "As if" there is full information
- Asymmetric information per se is not a problem
  - if we have a good mechanism to solve it
- Question: Do you think markets are the result of "natural selection" or "intelligent design"?

Signaling to Convey Private Information

- Signaling:
  - Action taken by an informed party for the sole purpose of credibly revealing his private information to an uninformed party
- Effective signals:
  - Are costly: not everyone can use it
  - Must be less costly, or more beneficial, to the person with the higher-quality product

Screening to Uncover Private Information

- Screening:
  - Action taken by an uninformed party to induce informed party to reveal private information
  - Some screening is common sense
  - Others are more subtle: offer two options of a good/service to induce consumers to reveal their preferences

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Asymmetric Information and Public Policy

- Asymmetric information: inefficient allocation
  - Government can sometimes improve market outcomes
- Complications of using public policy:
  - Private markets can sometimes deal with the problem using signaling or screening
  - The government rarely has more information than private parties
  - The government itself is an imperfect institution

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Active Learning 1: Asymmetric Information

For each situation below, identify whether the problem is moral hazard or adverse selection.

Explain how the problem has been reduced.

A. After 3 years of decreasing profits due to higher premiums, a car insurance company decides to offer two policies: one with low premiums and high deductibles, and one with high premiums and low deductibles.

B. Landlords require tenants to pay security deposits.

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Active Learning 1: Answers, A

A. Car insurance: low premiums/high deductible or high premiums/low deductibles

- Adverse selection:
  - The high premiums pushed safe drivers out, so, the pool of people still buying car insurance were the risky drivers.
  - Car insurance company reduces the problem by using screening: safe drivers choose the low premium/high deductible policy, and risky drivers choose the high premium/low deductible policy

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Active Learning 1: Answers, B

B. Landlords require tenants to pay security deposits.

- Moral hazard:
  - The landlord (principal) does not know how well the tenant (agent) treats the apartment.
  - Tenants may not be careful if they can get away without paying for damage they cause.
  - The security deposit increases the likelihood the tenant will take care of the property in order to receive his deposit back when he moves out.

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Political Economy

- Role for the government
  - Improve the inefficient or inequitable market outcome
- Political economy
  - The study of government using the analytic methods of economics

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The Condorcet Voting Paradox

- Choosing between two outcomes
  - Majority rules
- Choosing among several outcomes
  - "Democracy might run into some problems" - Condorcet
- The Condorcet voting paradox:
  - The failure of majority rule to produce transitive preferences for society.
  - Transitivity: A > B and B > C, then A > C.

EXAMPLE 4: The Condorcet Paradox – 1

- **A**, **B**, and **C** are three candidates running for an open seat on the city council.
- There are 3 types of voters, each with its own rankings of the candidates:

	Voter Type		
	Type 1	Type 2	Type 3
% of all voters	35%	45%	20%
1st choice	**A**	**B**	**C**
2nd choice	**B**	**C**	**A**
3rd choice	**C**	**A**	**B**

EXAMPLE 4: The Condorcet Paradox – 2

Suppose pairwise voting:
- First, **B** vs. **C**: **B** wins.
- Then, **A** vs. **B**: **A** wins.
- Overall winner: **A**

Another pairwise voting:
- First, **A** vs. **C**: **C** wins.
- Then, **C** vs. **B**: **B** wins.
- The overall winner: **B**

	Voter Type		
	Type 1	Type 2	Type 3
% of all voters	35%	45%	20%
1st choice	**A**	**B**	**C**
2nd choice	**B**	**C**	**A**
3rd choice	**C**	**A**	**B**

Lessons from The Condorcet Paradox

- Lessons:
  - Democratic preferences are not always transitive
  - The order on which things are voted can affect the result (setting the agenda can have a powerful influence over the outcome of a democratic election)
  - Majority voting does not tell us what outcome a society really wants

Arrow's Impossibility Theorem – 1

- Borda count
  - Give 1 point for last place, 2 points for second to last, 3 points for third to last, and so on
  - The outcome that receives the most total points wins
- Kenneth Arrow
  - What a perfect voting system would be?

Arrow's Impossibility Theorem – 2

- Arrow's properties of a voting system:
  1. Unanimity: If everyone prefers A to B, then A should beat B.
  2. Transitivity: If A beats B, and B beats C, then A should beat C.
  3. Independence of irrelevant alternatives: The ranking between any two outcomes should not depend on whether a third option is available.
  4. No dictators: There is no person who always gets his way, regardless of everyone else's preferences.

Arrow's Impossibility Theorem – 3

- Arrow: proved mathematically that no voting system can satisfy all four properties.
- Arrow's impossibility theorem:
  - A mathematical result showing that, under certain assumed conditions
  - There is no scheme for aggregating individual preferences into a valid set of social preferences
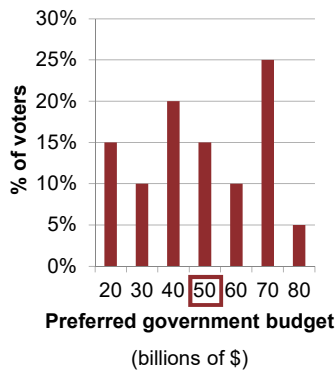
The Median Voter Is King – 1

- Median voter theorem:
  - A mathematical result showing that if voters are choosing a point along a line
  - And each voter wants the point closest to his most preferred point,
  - Then majority rule will pick the most preferred point of the median voter

EXAMPLE 5: The Median Voter Theorem

The median voter prefers a budget of $50 billion.

The choice closest to $50 will win any two-way race.

Suppose the choices are $40 and $70.

$40 will win, even though more voters prefer $70!

The Median Voter Is King – 2

- Implications:
  - In a two-party or two-candidate race, each party will move its position toward that of the median voter.
 - Minority views are not given much weight.

Politicians are People Too

- Politicians: motivated by self-interest, just like firms and consumers.
  - Some politicians motivated by reelection, willing to sacrifice the national interest toward that goal.
  - Others motivated by greed.
- The lesson about economic policy:
  - Is not made by benevolent leaders, but by real people with their own all-too-human desires.
  - Fails to resemble the ideals derived in economics textbooks

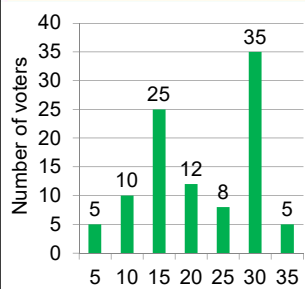## Active Learning 2: Let's Build a New Library!
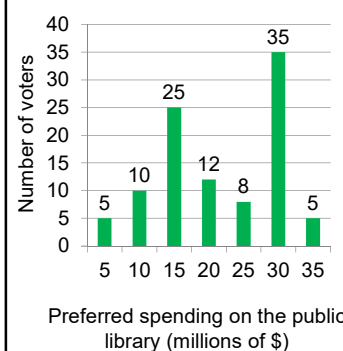
The preferences of the 100 people voting for the new library budget are listed in the diagram.

A. What is the median voter's preference?

B. There are two proposals: $15 and $30 million budget. Which one will win?

Active Learning 2: Answers, A: Median Voter

Number of voters

40, 35, 30, 25, 20, 15, 10, 5, 0

35, 25, 12, 10, 8, 5, 5

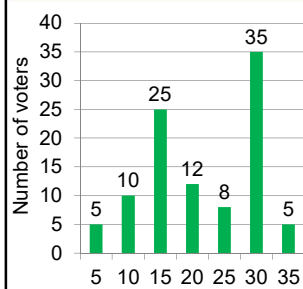Preferred spending on the public library (millions of $)
5 10 15 20 25 30 35

There are 100 voters (5+10+25+12+8+35+5). Lining up the voters by their preference, the median (50th) voter will choose $20 million budget.

5 voters want $5, 10 want $10, 25 want $15… so the first 40 voters want budgets of $15 million or lower.

The next 12 voters want $20. The median voter is one of these 12.

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Active Learning 2: Answers, B: $15m or $30m Budget?

Number of voters

40, 35, 30, 25, 20, 15, 10, 5, 0

35, 25, 12, 10, 8, 5, 5

Preferred spending on the public library (millions of $)
5 10 15 20 25 30 35

- $30 million budget is most popular

BUT: median voter theorem!

- The $30 m budget will get 8 + 35 + 5 = 48 votes
- The $15 m budget will get 5 + 10 + 25 + 12 = 52 votes

Winner: $15 million budget

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ASK THE EXPERTS
Behavioral Economics

"Insights from psychology about individual behavior – examples of which include limited rationality, low self-control, or a taste for fairness – predict several important types of observed market outcomes that fully-rational economic models do not."

What do economists say?

0% disagree   0% uncertain

100% agree
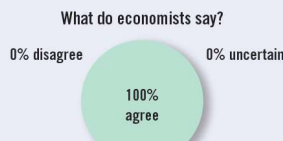
Source: IGM Economic Experts Panel, October 19, 2017

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Economics and Psychology

- aka "Behavioral Economics":
  - Subfield of economics that integrates the insights of psychology
- Insights from behavioral economics:
  - People aren't always rational
  - People care about fairness
  - People are inconsistent over time

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People Aren't Always Rational

- Studies of human decision find that people make systematic mistakes:
  - People are overconfident.
  - People give too much weight to a small number of vivid observations.
  - People are reluctant to change their minds.
    - Confirmation bias: People tend to interpret evidence to confirm beliefs they already hold.

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People Care About Fairness

- People's choices
  - Sometimes influenced more by their sense of fairness than self-interest.
  - People are driven in part by some innate sense of fairness.

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EXAMPLE 6: The Ultimatum Game

Two players who do not know each other have a chance to share a prize of $100.

- The proposer decides what portion of the $100 prize to give to the responder.
- The responder can accept or reject the offer.
  - Accepts the offer: the money gets split.
  - Rejects the offer: both get $0.
- If a proposer, how much would you offer?
- If a responder, what offer will you accept?

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EXAMPLE 6: Results From the Ultimatum Game

Predicted outcome (rational players)
- Proposer offer a 99-1 split and responder would accept ($1 is better than nothing).

Actual outcomes (experiments)
- Responder usually rejects lopsided splits like 99-1 as wildly unfair.
- Expecting this, proposer usually offers $30 or $40.
- Responder still views this as unfair, but not so much as to abandon his self-interest, so offer is accepted.

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People Are Inconsistent Over Time

- People tend to prefer instant gratification
  - Even when delaying would increase gratification
- Result: People fail to follow through on plans to do things that are dreary, take effort, or cause discomfort.
  - People often save less than they plan
- To help follow through, people look for ways to commit themselves to their plans.
  - Worker has money taken out of paycheck before he ever sees it

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THINK-PAIR-SHARE

You are playing the Dictator game: it starts with the premise of the Ultimatum game, but the responder cannot reject the offer, the responder can only say "thank you" and accept any offer made.

A. While in the Ultimatum game, most proposers would offer a "fair" $30 or $40 to the responder, how will their answer change in the Dictator game?

B. How will your answer change if, as a proposer, you would have the ability to not only give money but also to take money (up to $50) from the responder?

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CHAPTER IN A NUTSHELL

- In many economic transactions, information is asymmetric.
- When there are hidden actions, principals may be concerned that agents suffer from the problem of moral hazard.
- When there are hidden characteristics, buyers may be concerned about the problem of adverse selection among the sellers.
- Private markets sometimes deal with asymmetric information with signaling and screening.

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CHAPTER IN A NUTSHELL

- Government policy can sometimes improve market outcomes, governments are imperfect institutions.
- The Condorcet paradox shows that majority rule fails to produce transitive preferences for society.
- Arrow's impossibility theorem shows that no voting system can be perfect.
- Democratic institutions will produce the outcome desired by the median voter, regardless of the preferences of the rest of the electorate. Individuals who set government policy may be motivated by self-interest rather than the national interest.

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CHAPTER IN A NUTSHELL

- The study of psychology and economics reveals that human decision making is more complex than is assumed in conventional economic theory.
- People are not always rational; they care about the fairness of economic outcomes (even to their own detriment), and they can be inconsistent over time.

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Chapter 22: Frontier of Microeconomics

- Asymmetric Information
  - Experiment 11 is a "lemon" market!
- Political Economy
  - Political candidates act like "location" firms!
- Economics and Psychology
  - aka "Behavioral" Economics
    - vs. Non-behavior Economics (What is that?)
  - What Theory Says
    - vs. What People Actually Do

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Chapter 22: Frontier of Microeconomics

- Asymmetric Information
- Political Economy
- Economics and Psychology
- My own research agenda is on these frontier!
  - Talk to me after class if you interested…
- Homework: Mankiw, Ch.22, 2, 3, 5-7, 9
- Challenge Questions (Past Finals)
  - 2007 - Part 5   2012 - Essay B6-B7
  - 2018 - Essay D   2019 - Essay D7-D8

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My Research on the Frontier

- Strategic Information Transmission
  GEB: Overcommunication
  AER: Eyetrack people when they cheap talk (lying)
  REE: Level-k model (for cheap talk games)
  GEB: Decipher conflicting messages of 2 senders?!
  APSR: Legislative committee design: Open vs. closed rule

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My Research on the Frontier

- Behavioral Game Theory and Eyetracking
  AER: Eyetrack people when they cheap talk (lying)
  JEEA: Learning to play normal form games,
  Psych Science: Answering Trivia questions, and
  GEB: Playing spatial beauty contest games
- LUPI Game and Other Learning Experiments
  AEJ-micro: Least Unique Positive Integer (LUPI) game
  EL: Lowest Unique Bid Auction (LUBA) games
  GEB: Imitation learning in winner-take-all games
  T&D: Learning to overcome the Monty Hall problem

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My Research on the Frontier

  JEBO: Confucianism and Time/Risk Preferences
- Political Economy Experiments
  PER: Pivotal-voting games
  - Design legal prediction markets
  CPE: Choice behind veil of ignorance
- Classroom Experiments and Replication
  PER: Pivotal-voting games
  REE: Level-k model (for cheap talk games)
  Nature Human Behaviour: MobLab replicates results of continuous double auctions and ultimatum game

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Recommendation for Further Studies

1. Take good courses such as:
   - 古慧雯/黃貞穎's Intermediate Microeconomics
   - 陳旭昇+駱明慶's Statistics and Econometrics
   - My Experimental Economics or
   - (Graduate) Micro Theory I
2. Start to do research/write thesis (學士論文)
   - Even replicating a classic experiment is great!
3. BESAP: Visit UC-Berkeley's Econ Dept.
   - Challenge: Pay their tuition!

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