



Final exam: Wed March 19, 8:00 a.m.
30%: Chapters 5, 12-16
70%: Chapters 17-20

Chapter 19: Uncertainty and information

- A. Risk and expected value
- B. Risk neutrality and risk aversion
- C. Private information
- D. Insurance markets

Insurance policy:

- I pay the insurance company some money now (called the insurance premium)
- The insurance company will cover my expenses if a certain event occurs (house burns down, car is in accident, I get cancer, ...)

- Insurance premium is more than the expected value of payout
- E.g., I pay \$500 for a car insurance policy that has 1/100 chance of paying \$20,000
- insurance premium = \$500
- expected payout = \$200

- Insurance company makes profit from law of large numbers
- People buy policy because they are risk averse

Potential problems with insurance markets:
(1) Adverse selection

- Suppose there are two kinds of drivers:
- safe drivers: probability of accident = 1/200 per year
 - risky drivers: probability of accident = 1/20 per year
 - payout for accident = \$20,000

Expected payout for
safe drivers:
 $(1/200) \times (\$20,000) =$
\$100 per year

Expected payout for
risky drivers:
 $(1/20) \times (\$20,000) =$
\$1,000 per year

Suppose that $\frac{1}{2}$ the
drivers are safe and
 $\frac{1}{2}$ are risky and an
insurance company
issues same policy to
both types

Expected payout for
safe drivers:
 $(1/200) \times (\$20,000) =$
\$100 per year

Expected payout for
risky drivers:
 $(1/20) \times (\$20,000) =$
\$1,000 per year

Insurance company's
expected payout is:
 $(1/2) \times (\$100) +$
 $(1/2) \times (\$1,000)$
= \$550 per policy

Insurance company
could charge \$550
per policy and still
break even

Expected payout for
safe drivers:
 $(1/200) \times (\$20,000) =$
\$100 per year

Expected payout for
risky drivers:
 $(1/20) \times (\$20,000) =$
\$1,000 per year

Suppose that
consumers' risk
aversion is such that
they're willing to pay
\$1.00 premium for
every 50¢ in expected
payout

Expected payout for
safe drivers:
 $(1/200) \times (\$20,000) =$
\$100 per year

Expected payout for
risky drivers:
 $(1/20) \times (\$20,000) =$
\$1,000 per year

Safe drivers are willing
to pay \$200/year
premium

Risky drivers are willing
to pay \$2,000/year
premium

Conclusion: if insurance policy costs \$550,
only the risky drivers would buy it

If only risky drivers buy it, insurance
company's expected payout is \$1,000

Insurance will cost more than \$1,000 in
equilibrium

Definition:

adverse selection refers to the
phenomenon where high-risk individuals
are more likely to buy insurance than low-
risk individuals, thereby raising insurance
payouts and equilibrium premia

One way insurance companies cope with
adverse selection:

statistical discrimination

Insurance company uses some aspect of
driver that they can identify that
correlates with payout rates

Examples:

- driving record
- age
- zip code

Potential problems with insurance markets:

- (1) Adverse selection
- (2) Moral hazard

Once I have insurance, I no longer personally pay the cost for my risky behavior

If I engage in more risky behavior precisely because I am insured it is called *moral hazard*

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- E. Market for loans

Question: are you going to default (not repay the money you borrowed or not repay on time)?

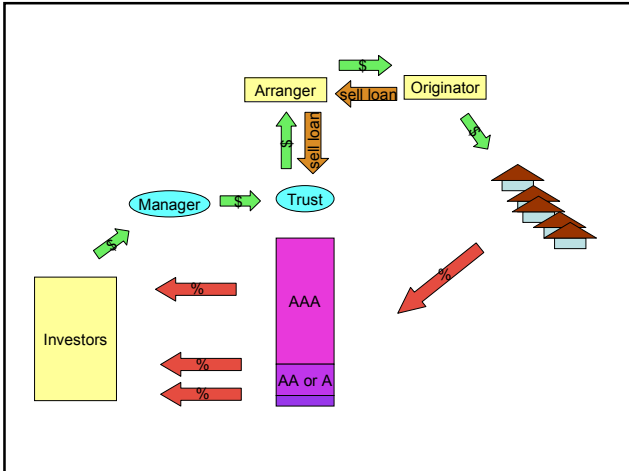
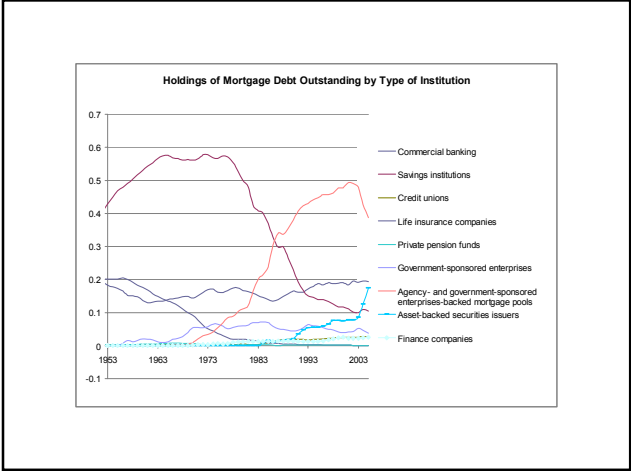
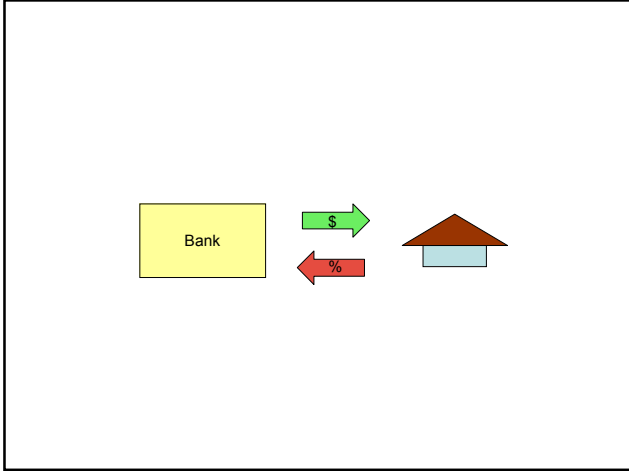
–The loan default cost depends on the quality of the borrower.
–Low-risk borrowers always repay.
–High-risk borrowers frequently default on their loans.
–Banks cannot tell whether they are lending to a low-risk or a high-risk borrower so everyone pays the same interest rate.

–If banks offered loans to everyone at the low-risk interest rate, borrowers would face *moral hazard* and the banks would attract a lot of high-risk borrowers—*adverse selection*.
–Most borrowers would default, and the banks would incur losses.
–If the banks offered loans to everyone at the high-risk interest rate, low-risk borrowers would be unwilling to borrow.

Private Information

–Faced with moral hazard and adverse selection, banks use *signals* to discriminate between borrowers and *ration* or limit loans to amounts below that demanded.
–To restrict the amounts they are willing to lend to borrowers, banks use signals such as length of time in a job, ownership of a home, marital status, age, and business record.

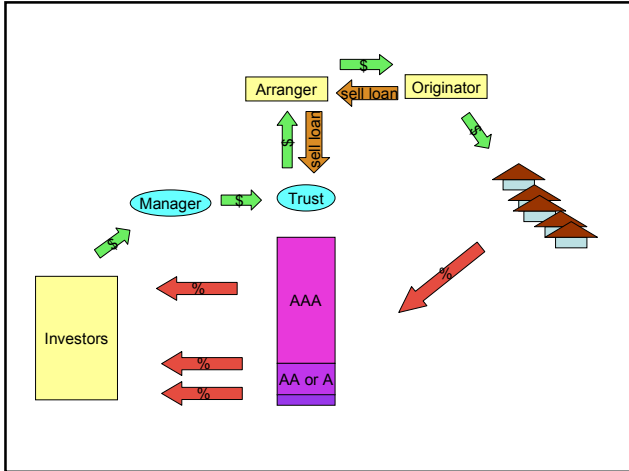
Ninja loans—
No income, no job, no assets



Originator makes profit by issuing a loan, not affected by whether loan gets repaid

Moral hazard-- make as risky loans as possible to anybody

- no documentation of income
- little or no down payment
- ballooning interest payments that can't be met



Chapter 19: Uncertainty and information

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- E. Market for loans
- F. Managing risk in financial markets

- Stocks and bonds are risky investments
- Diversification to lower risk is not putting all one's eggs into the same basket
- How does diversification reduce risk?

Suppose you can invest \$100,000 in one of two projects.

- Each project promises you an equal chance of \$50,000 profit or a \$25,000 loss.
- The expected return on each project is $(\$50,000 \times 0.5) + (-\$25,000 \times 0.5)$, which is \$12,500.
- Suppose the two projects are independent, which means that the outcome of one project in no way influences the outcome of the other.

Undiversified

- Invest \$100,000 in either Project 1 or Project 2
- Your expected return is \$12,500
- But there is no chance that you will actually make a return of \$12,500
- You either earn \$50,000 or lose \$25,000.

Diversified

- Invest 50 percent of your money in Project 1 and 50 percent in Project 2. (Someone else put up the other 50 percent in each project.)
- You now have *four* possible returns.
- And each of the four possible outcomes has a 25 percent chance of occurring.