

ECON 3113 Microeconomic Theory I

Lecture 14: Moral Hazard

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Introduction

- Besides hidden information (adverse selection), another source of inefficiency is **moral hazard** – people taking hidden action.



Reminder: Insurance Model

- Suppose an individual is endowed with wealth $\$w$ and a car worth $\$L$.
- There is a probability p that the car will be stolen.
- Two states: good state (car not stolen) and bad state (car stolen)
- The individual's wealth in the good state is $W_g = w$ and your wealth in the bad state is $W_b = w - L$.
- The individual's expected utility is

$$(1 - p) U(W_g) + pU(W_b).$$

- The individual is risk averse, so his/her U is concave.

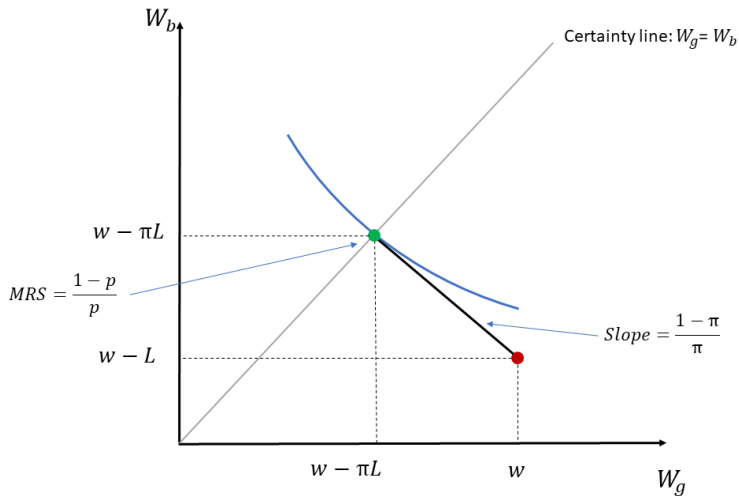
Insurance Model

- If insurance companies offer a premium rate of π , the individual can get a coverage q for the loss of car at a premium of πq .
- By purchasing a coverage of q , the individual has

$$W_g = w - \pi q \text{ and } W_b = w - \pi q - L + q.$$

- The insurance industries is very competitive, so insurance companies must offer actuarially fair premium rate to get any business.
- At an actuarially fair premium rate, i.e., $\pi = p$, the individual will opt for full coverage.

Insurance Model: Full Coverage

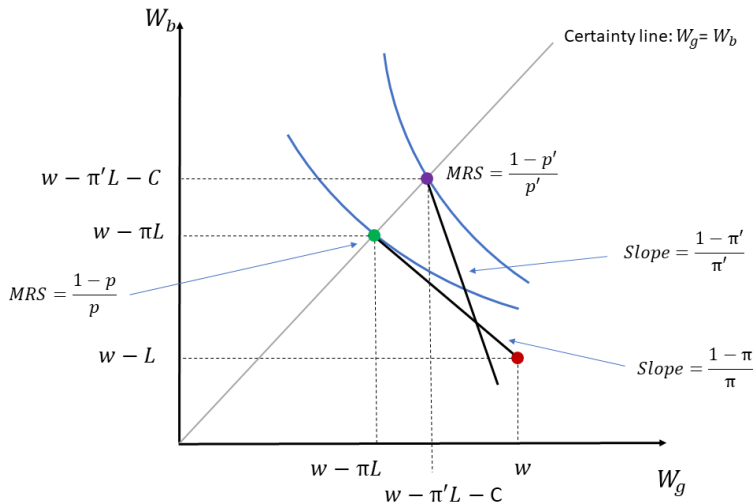


- Suppose the individual can take some precautionary actions which reduces the probability of car theft:
 - e.g., installing alarm, parking the car at safe locations, ...
- The precaution costs C , and it lowers the probability of losing the car from p to p' .
- Suppose the precaution is cost-justified: $C < (p - p') \times L$.

Insurance with Perfect Information

- If the insurance company **can perfectly see** whether the individual has taken the precaution....
- ...then it is willing to offer a lower premium rate $\pi' = p'$ if precaution has been taken;
-and is willing to offer a higher premium rate $\pi = p$ if precaution is not taken.
- The individual will find it optimal to take precaution.
- Taking precaution is Pareto-efficient:
 - The outcome with precaution taken gives better payoff to the individual without affecting the insurance company's profit.
 - First-best outcome

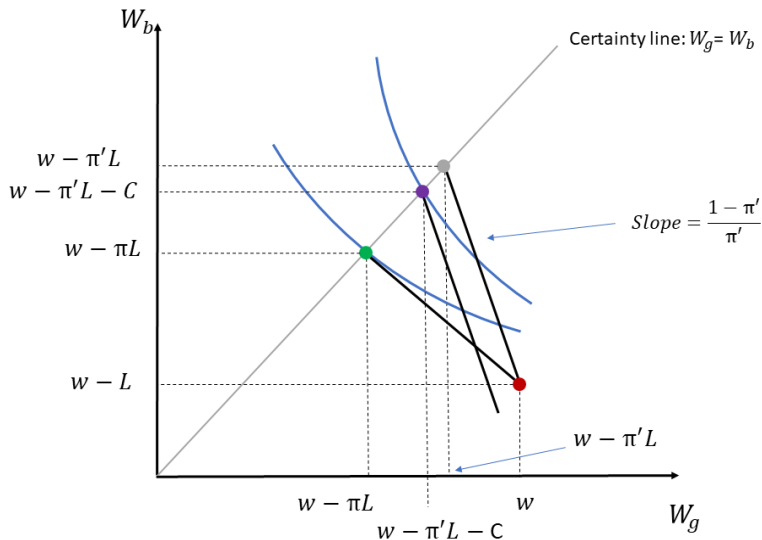
Insurance with Perfect Information



Insurance with Moral Hazard

- In reality, monitoring is likely to be costly or impossible.
- If the insurance company cannot observe the individual's action, it can only offer a single (unconditional) premium rate.
- Suppose the rate is $\pi' = p'$.
- If the individual takes precaution, he will buy full coverage, getting $W_g = W_b = w - p'L - C$.
- Alternatively, he can buy full coverage and **take no precaution**, which gives payoffs $W_g = W_b = w - p'L$.
- Anticipating this, the insurance company has to raise the premium rate to p ; otherwise, it will go broke.
- As a result, the individual can only get payoffs $W_g = W_b = w - pL < w - p'L - C$.

Insurance with Moral Hazard



Moral Hazard and Inefficiency

- The moral hazard problem causes inefficiency.: efficient precaution fails to be taken.
- The individual suffers from the insurance company failing to observe his precaution decision.
- If agents' behaviors can be "controlled", efficiency can be improved by making
 - the individual take precaution, and buy full coverage
 - the insurance company offer low premium rate p' .

Second-best Contract

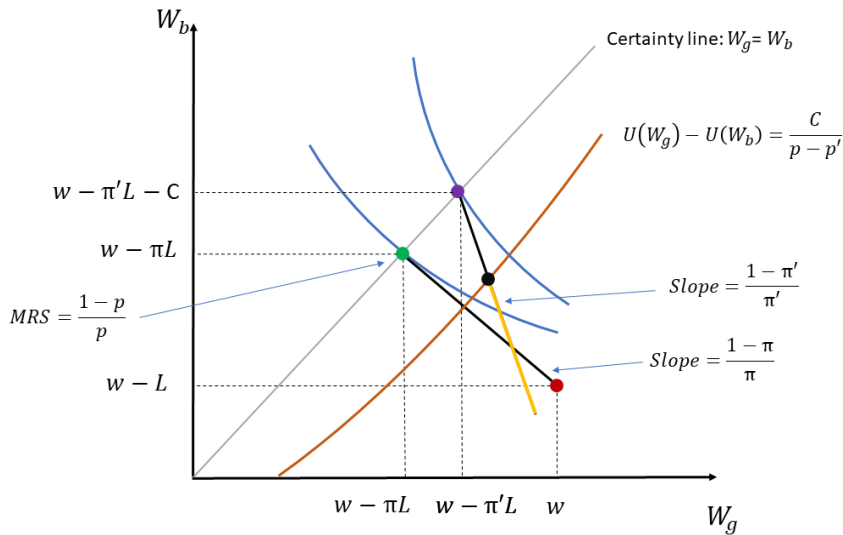
- Directly controlling one's behaviors is typically impossible.
- Incentives have to be provided for desirable behaviors.
- Fixing state-incomes W_g and W_b , the individual has incentive to take precaution if

$$\begin{aligned}(1 - p') U(W_g) + p' U(W_b) - C &\geq (1 - p) U(W_g) + p U(W_b) \\ \underbrace{(p - p') [U(W_g) - U(W_b)]}_{\text{benefit (increase in expected utility) of precaution}} &\geq C\end{aligned}$$

benefit (increase in expected utility) of precaution

- This **incentive compatibility condition** can only be satisfied if $W_g > W_b$, i.e., if the individual is given only partial coverage.

Second-best Contract



- The second-best contract therefore necessarily exposes the individual to some risk:
 - Copayment and deductibles
- Alternatively, insurance company can adopt other tools such as
 - history-dependent premium (dynamic incentives) and
 - reward for healthy behavior/habits.

- Moral hazard problem: one side of the transaction can take **hidden actions** that affect all transacting parties.
- Moral hazard can potentially lead to market inefficiency
 - insurance
 - employment relation
 - experience-goods
 - corporate/ political governance
 - capital/asset market
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