

Economics of Information

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Insurance

- Some insurance contracts should be provided by the government or public corporations.
- Health insurance and unemployment benefits are provided by the government by Japan. Can we justify this?
- There are two information problems, adverse selection and moral hazard, with the insurance contract.

Adverse Selection

- Insurance programs are more attractive to people who are risky and know that they are risky, than less risky people.
- If you expect that you will get cancer highly likely, you would like to buy a cancer insurance program.
- Therefore only high-risk customers want to purchase the insurance, the premium goes up, and the low-risk customers are not insured.

Moral Hazard

- The risk of losing your job is, by large parts, controlled by yourself. If you don't work hard, you can easily get fired and start living on insurance.
- If an unemployment insurance program were run by a private company, they would attract so many customers of low moral standard, and face a high risk of bankruptcy.

Compulsory Insurance

- The government of Japan obliges people to get in the National Health Insurance Program, in order to include more healthy and less risky people in the Program.
- All the employees are required to buy the unemployment insurance. Workers of high moral standard will be less likely to lose their jobs.

Insurance Contract

There are state 1 (good) and state 2 (bad).

The bad state occurs with probability π ,
while the good state with probability $1 - \pi$.

If there is no insurance, the customer gets w in the good state,
while he gets $w-L$ in the bad state, where L is the loss.

The insurance company offers an insurance contract (z, q) ,
where z is the amount covered by the contract when the state is bad,
and q is the premium rate. In both the states, the customer pays qz .

A Model of Insurance

The consumer's objective is

$$\max \{ (1 - \pi)u(x_1) + \pi u(x_2) \}$$

subject to

$$x_1 = w - qz, \quad \text{and} \quad x_2 = w - L + z - qz$$

We can eliminate z to obtain

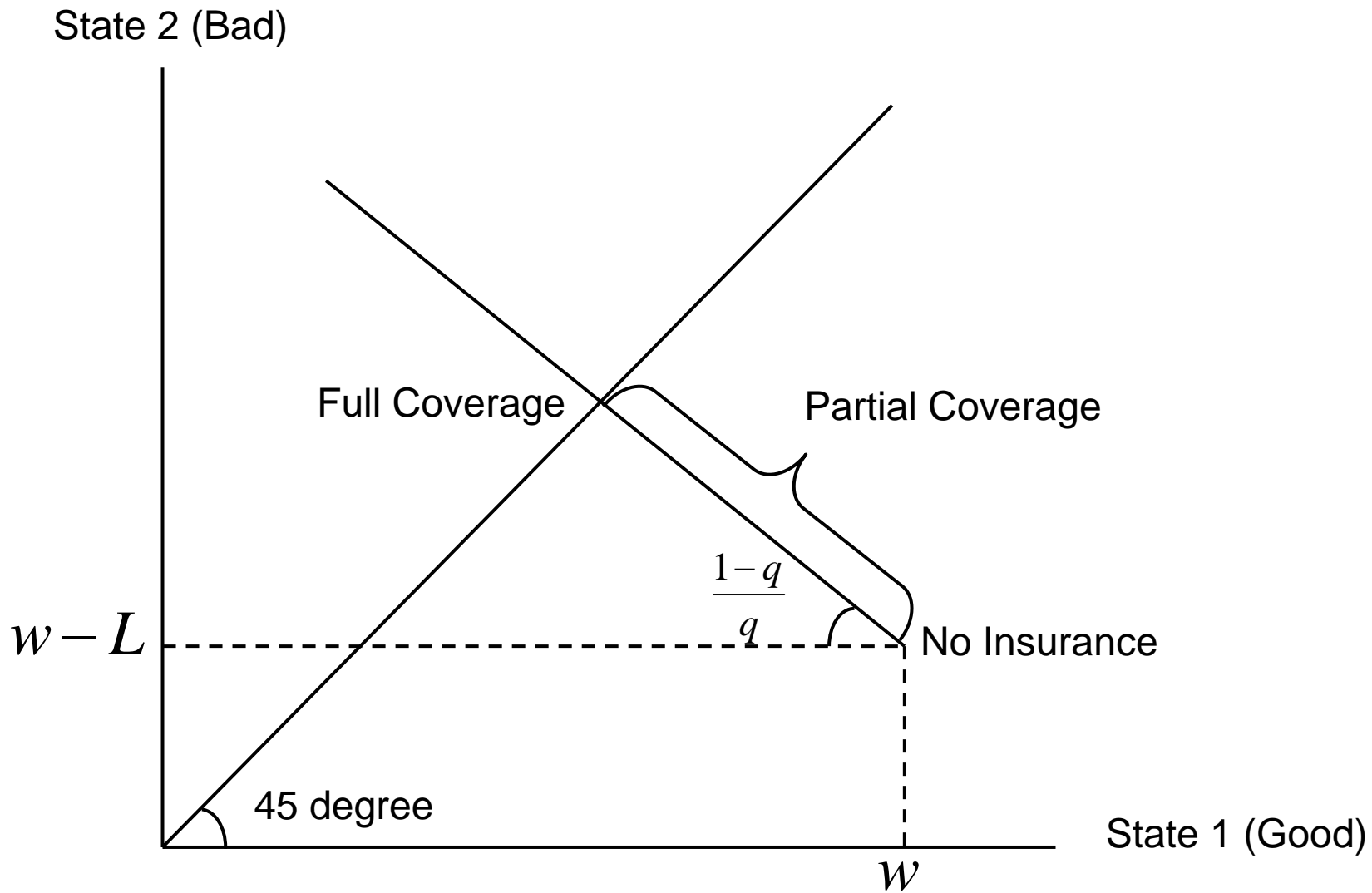
$$x_2 = \frac{w}{q} - L - \left(\frac{1 - q}{q} \right) x_1$$

By taking the total derivative of the utility function, we have the slope of the indifference as

$$-\frac{dx_2}{dx_1} \Big|_{u=\text{constant}} = \left(\frac{1 - \pi}{\pi} \right) \left(\frac{u'(x_1)}{u'(x_2)} \right)$$

On the 45 degree line, $x_1 = x_2 = x$. Therefore,

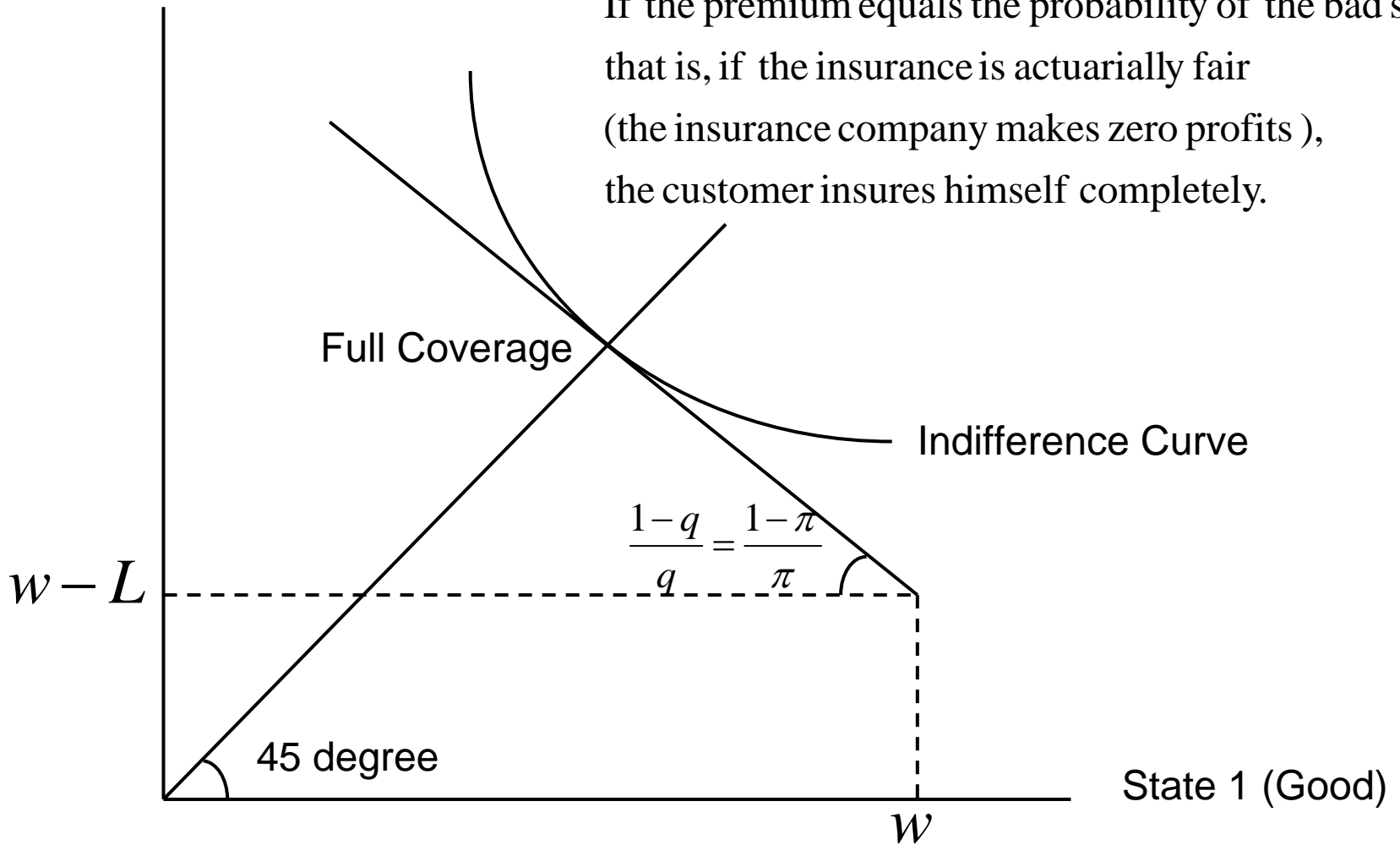
the indifference curve has slope = $\left(\frac{1 - \pi}{\pi} \right)$ on the 45 degree line.



State 2 (Bad)

Case I: $q = \pi$

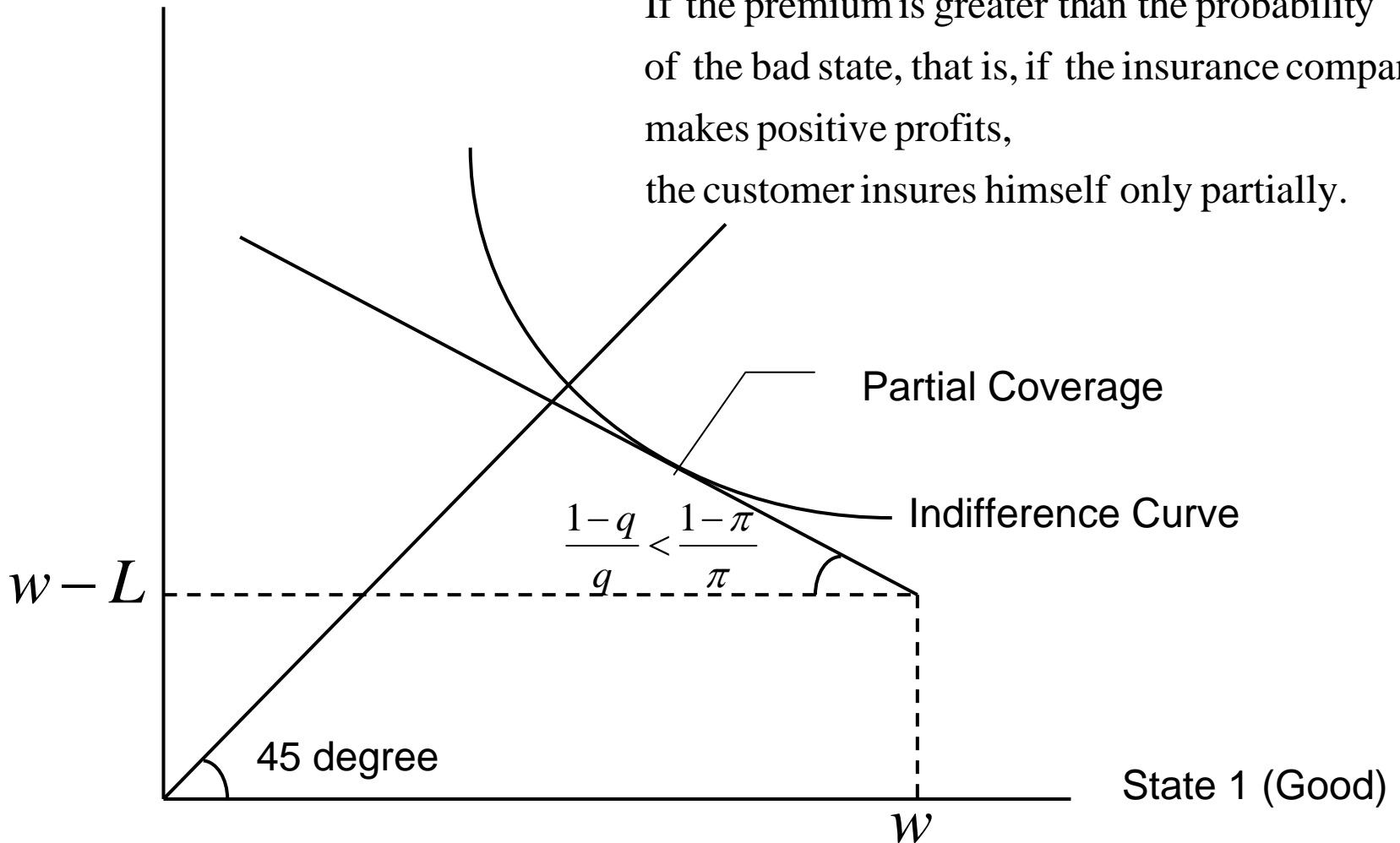
If the premium equals the probability of the bad state, that is, if the insurance is actuarially fair (the insurance company makes zero profits), the customer insures himself completely.

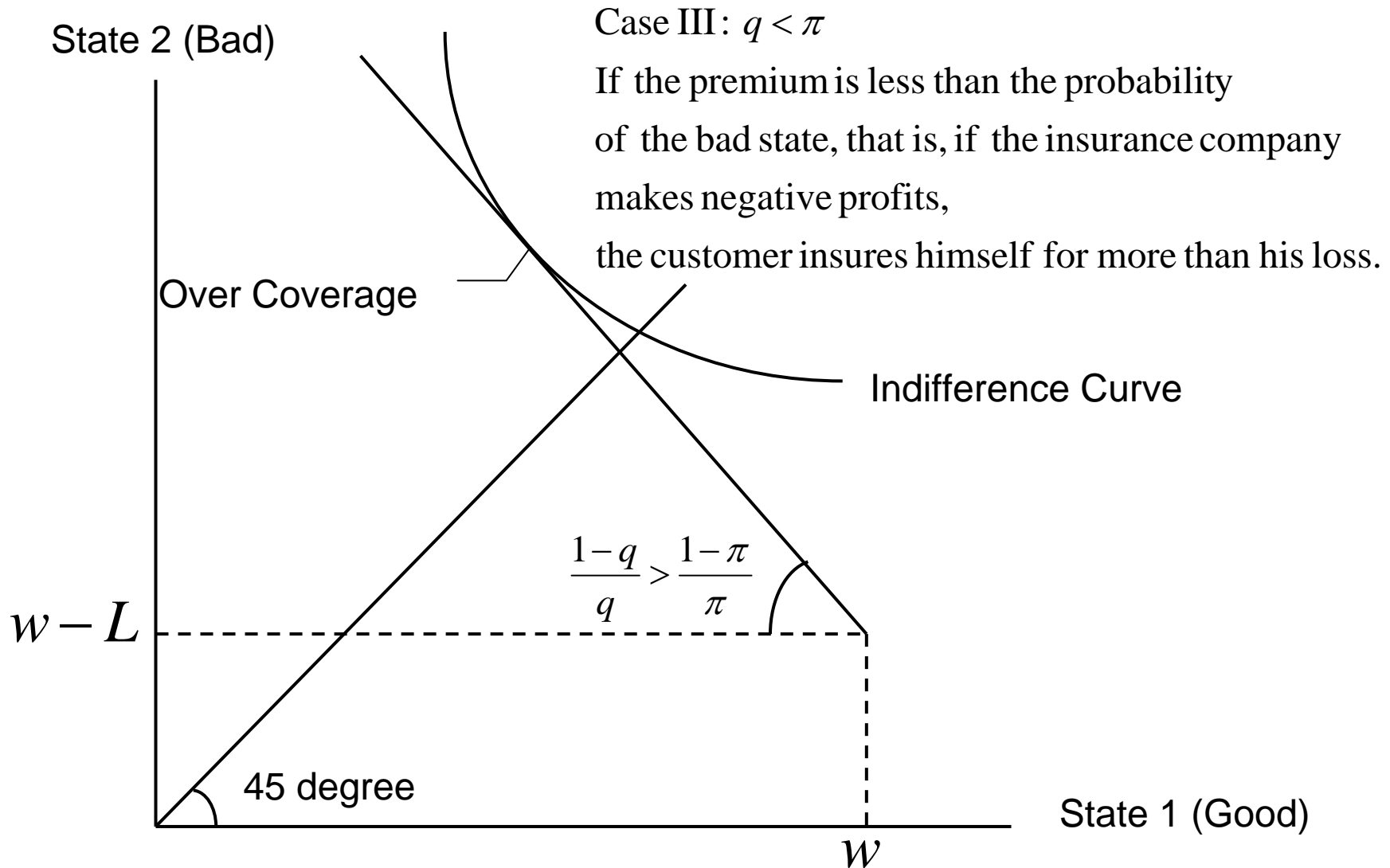


State 2 (Bad)

Case II: $q > \pi$

If the premium is greater than the probability of the bad state, that is, if the insurance company makes positive profits, the customer insures himself only partially.

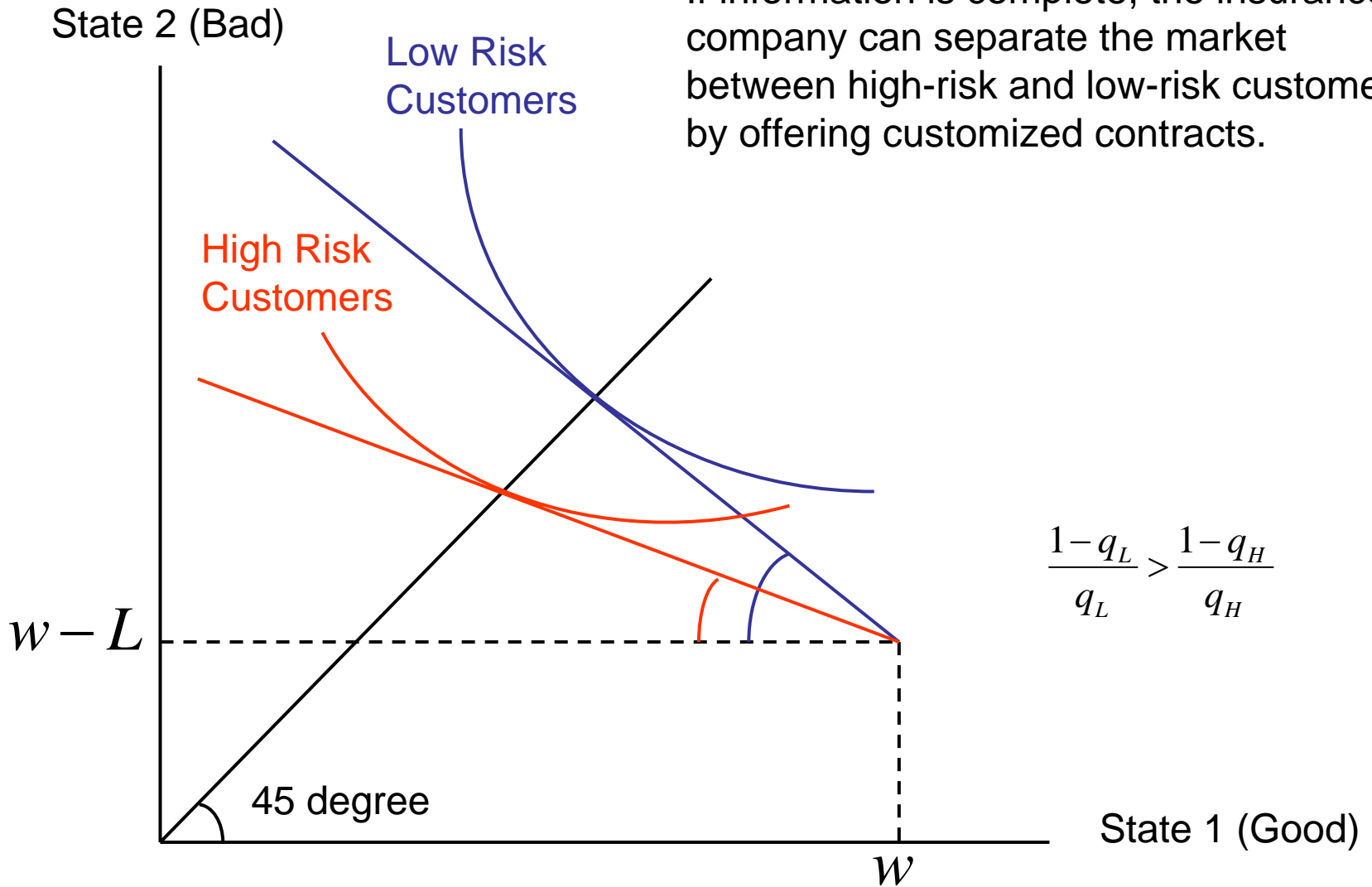




The Insurance Market

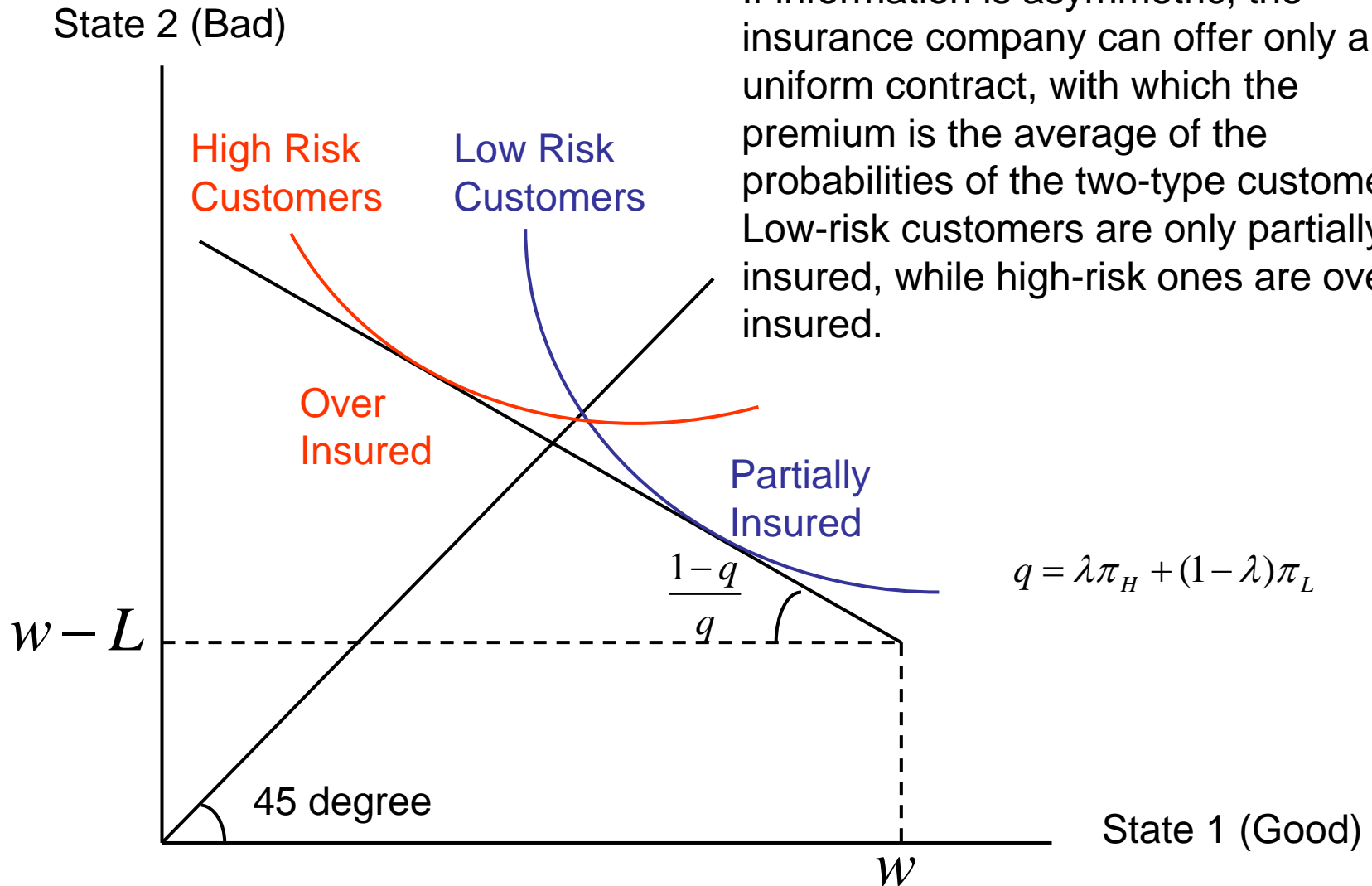
- If the insurance market is sufficiently competitive, new insurance companies enter the market until the profit equals zero. Then consumers fully insure themselves.
- If the information is complete, that is, if the insurance company knows the risk probability of each consumer, the company offers a specified contract to each consumer.

If information is complete, the insurance company can separate the market between high-risk and low-risk customers, by offering customized contracts.

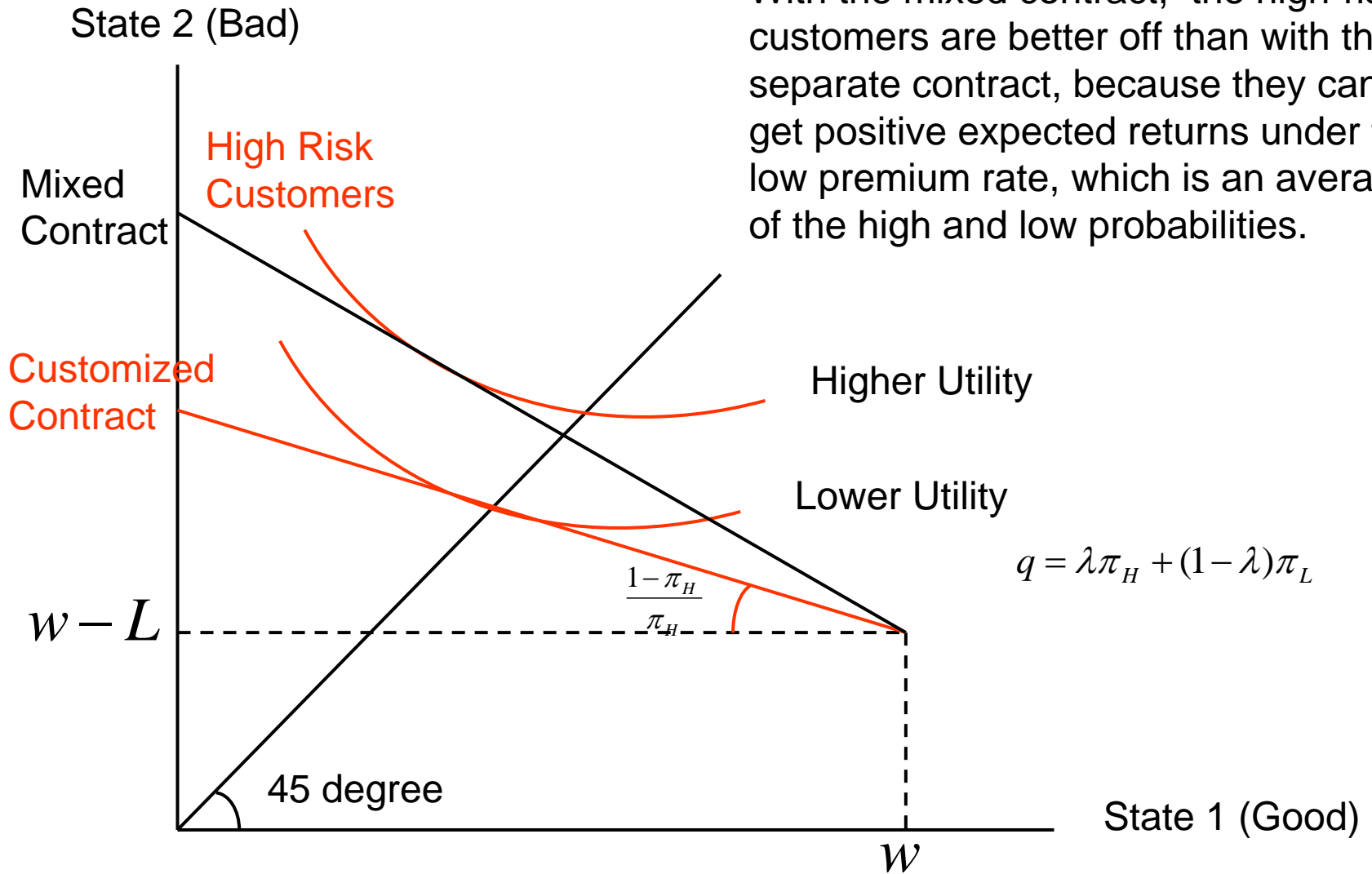


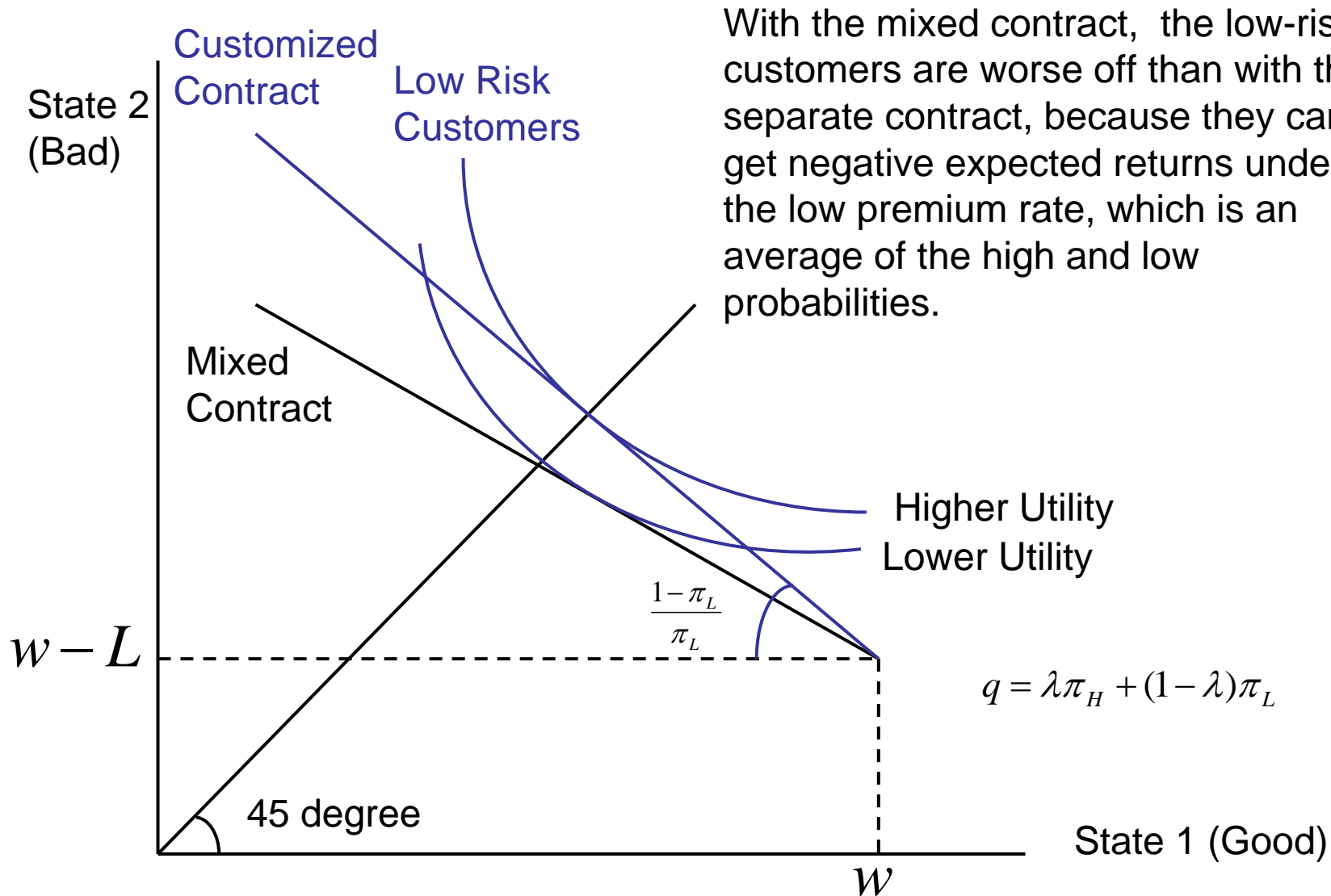
$$\frac{1 - q_L}{q_L} > \frac{1 - q_H}{q_H}$$

If information is asymmetric, the insurance company can offer only a uniform contract, with which the premium is the average of the probabilities of the two-type customers. Low-risk customers are only partially insured, while high-risk ones are over-insured.



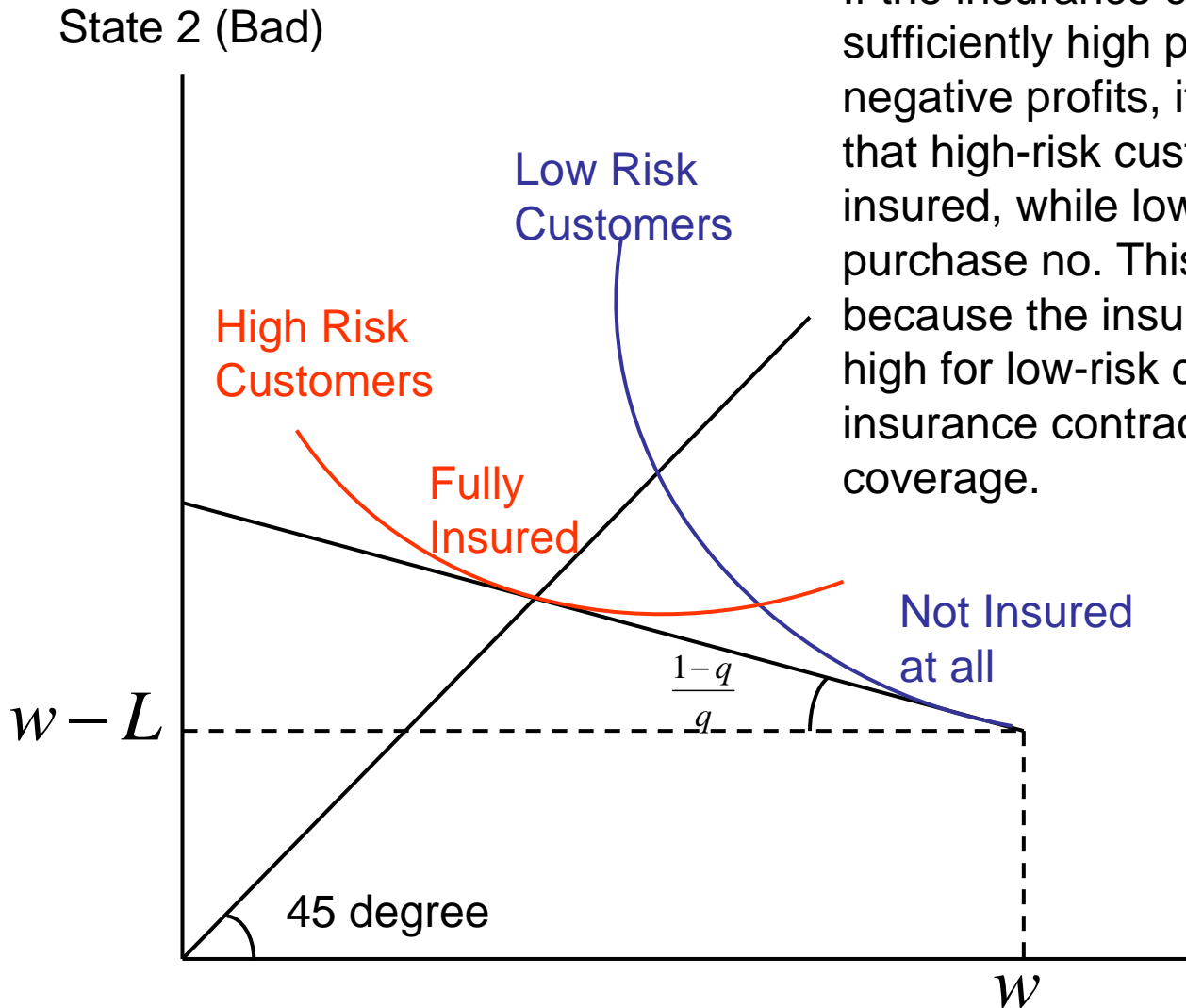
With the mixed contract, the high-risk customers are better off than with the separate contract, because they can get positive expected returns under the low premium rate, which is an average of the high and low probabilities.





With the mixed contract, the low-risk customers are worse off than with the separate contract, because they can get negative expected returns under the low premium rate, which is an average of the high and low probabilities.

If the insurance company offers a sufficiently high premium to get non-negative profits, it might be the case that high-risk customers are fully insured, while low-risk customers purchase no. This case occurs because the insurance premium is too high for low-risk customers to buy an insurance contract with positive coverage.



$$q = \lambda\pi_H + (1 - \lambda)\pi_L$$

State 1 (Good)

Public Insurance

- In many advanced countries, health insurance and unemployment insurance are provided by the government. This fact is justifiable by Economics.
- In the market economy with asymmetric information in the sense that the insurer cannot fully observe each customer's risk probability, the insurer offers a mixed contract across customers with different risks.
- Low risk customers are not willing to buy the mixed contract, because the insurance premium is too high.

Moral Hazard

- The probability of accidents can be, more or less, controlled by customers themselves.
- Once people buy a drivers' insurance, there is few incentives for them to drive their cars safely, because the loss is generously covered by the insurance.
- Moral hazard itself does not hurt the insurance business. But, the existence of insurance is likely to make the society more risky.

Questions

- Consider the recent aggressive business of American insurance companies in Japan (Alico, Aflac, etc.)
 1. What type of customers do they attract by the advertisements to general public through TV?
 2. Why are the TV CMs of Japanese insurance companies much less appealing?
 3. How can you explain the American insurance companies' sales strategy in terms of Economics?