Demand for Health Insurance

PH 126: Introduction to Health Economics and Policy
UC Berkeley

February 7, 2008

Outline

Why purchase insurance?

There are two fundamental reasons why people demand insurance

- Uncertainty
  If you (and your insurance company) could see your entire health future, you'd be better off saving and self-insuring.
- Risk aversion
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- The probability of the event occurring.
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- The magnitude of the potential loss
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- **Income**
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People only buy insurance if the benefit exceeds the price. This means that the value of the service that they expect to receive is higher than the price of insurance. In other words, they expect to be expensive clients for the insurance company.

Since it only expects expensive clients, the insurance company raises rates. But now people have to expect to be even sicker for insurance to be a good deal. This vicious circle is known as *adverse selection*.

Adverse selection

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Berkeley economics professor George Akerlof won the Nobel Prize in 2001 for studying asymmetric information, with specific application to the used car industry, in "The Market for Lemons: Quality Uncertainty and the Market Mechanism" in the *Quarterly Journal of Economics* in 1970.

Adverse selection

What can insurance companies do to protect against adverse selection?

- Exclude pre-existing conditions from coverage
- Require pre-coverage tests of health
- Enforce a waiting period before certain procedures are covered
- Insure all members of a group composed by individuals of varying risk (e.g., an entire company)
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Akerlof's solution: get a warranty

Adverse selection

Adverse selection would be mitigated if everyone was required to purchase insurance. This is the logic behind claims that mandating insurance coverage will lower premium prices.

Moral hazard

Moral hazard arises because individuals do not bear the full cost of health care. This manifests itself in two ways:

- An individual is less likely to take actions to avoid risk and and the need for treatment.
- An individual will seek higher compensation once negative consequences arise; he will seek overtreatment.

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Insurance mechanisms that provide an incentive for patients to reduce costs can help alleviate the moral hazard problem.

Types of insurance coverage

- Deductibles
  Consumers pay the full price of medical care up to a certain amount, then insurance pays the rest.
  Advantage: lowers administrative costs
  Disadvantage: above the limit, consumers have no incentive to cut costs

- Co-insurance
  Consumers pay a percentage of all medical costs.
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  A fixed amount based upon the treatment but irrespective of cost is paid to the consumer.
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- Stop-loss
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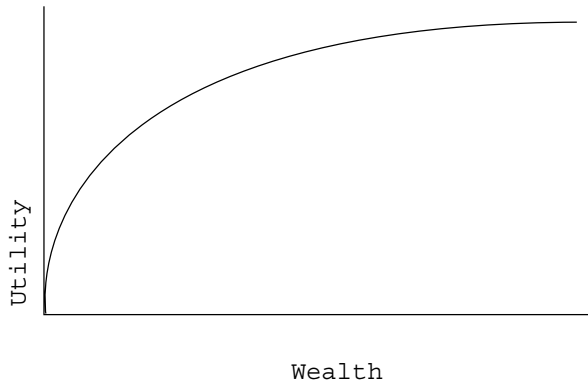
Let's look at an individual's total utility over his total wealth. For this example, assume that $U = W^{\frac{1}{2}}$
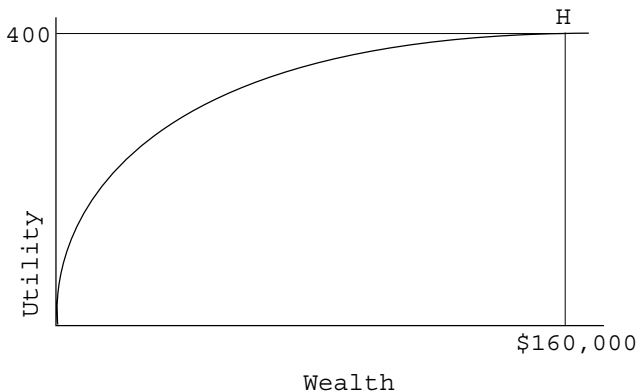
There are two states of the world:
He can be healthy with wealth $160,000 and utility 400.
There's a 75% chance of being in this state.
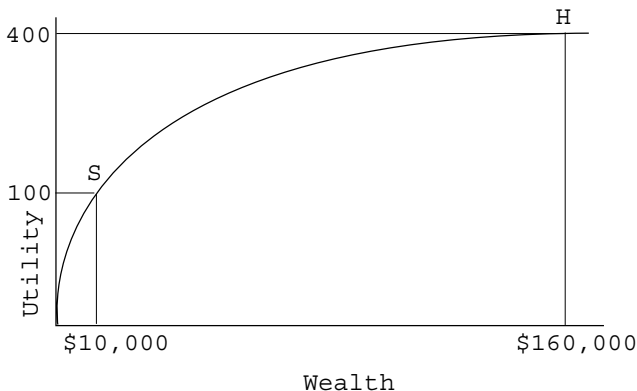
Or sick with wealth $10,000 and utility 100. In other words, sickness costs him $150,000.

There's a 25% chance of being in this state.

How wealthy does he expect to be?

$$
\begin{aligned}
EW &= \Pr(\text{healthy}) \times (\text{healthy wealth}) + \Pr(\text{sick}) \times (\text{sick wealth}) \\
&= 0.75 \times \$160,000 + 0.25 \times \$10,000 = \$122,500
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What is his *expected utility*?

$$EU = \text{Pr(healthy)} \times \text{(healthy utility)} + \text{Pr(sick)} \times \text{(sick utility)}$$
$$= 0.75 \times 400 + 0.25 \times 100 = 325$$
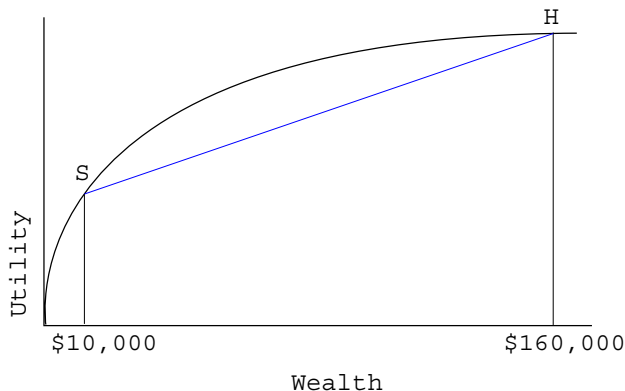
If we want to know the expected utility for any probability, all we have to do is draw a line between the high and low state points on the graph.
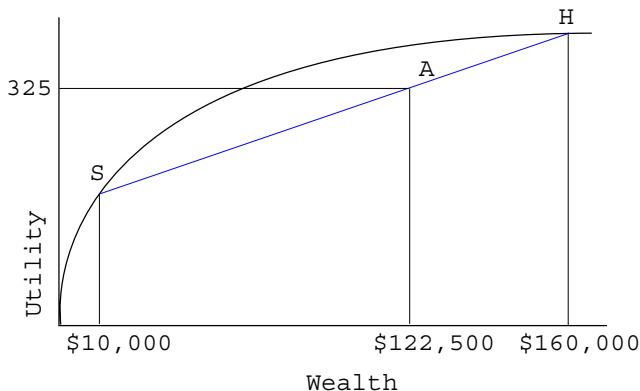
Now we can find the expected utility of having a 25% chance of being sick. As we saw, that gives us an expected wealth of $122,500 and an expected utility of 325.

Now the idea of insurance comes into play. Rather than taking a risk and having either $160,000 or $10,000 depending on whether he gets sick or not ("self-insuring"), he can purchase insurance. If he buys insurance, he will have the same wealth in either state: $160,000 minus the cost of insurance.
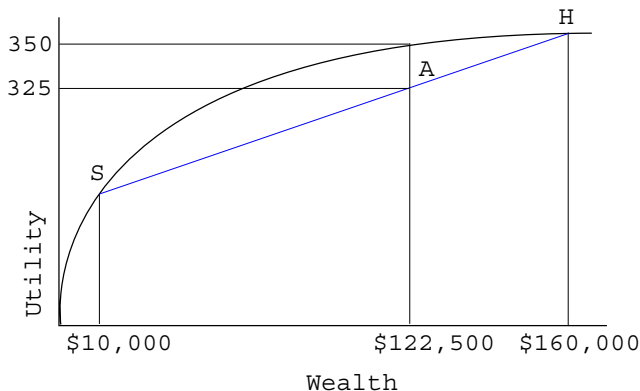
His expected loss is his healthy income minus his expected income: $160,000 − $122,500 = $37,500 If he buys insurance for exactly this expected loss, then the price is called *actuarially fair*.

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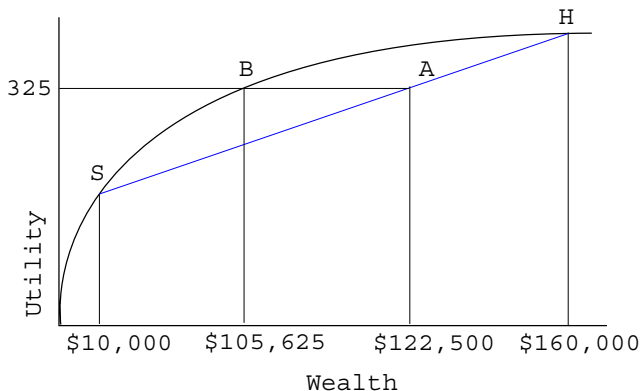
An actuarially fair plan gives wealth of $122,500 for sure, which has a utility of 350. This is higher than his expected utility of taking the risk (325). So insurance makes him better off.
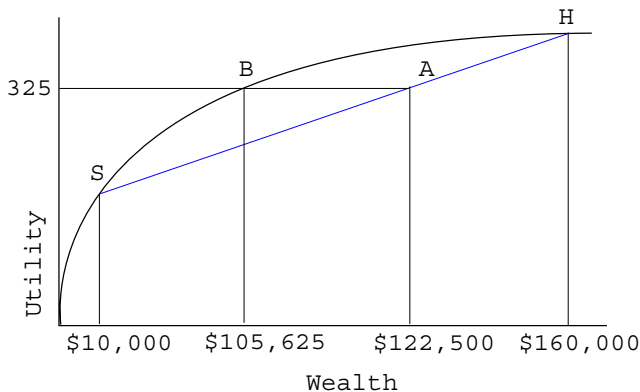
Utility with insurance
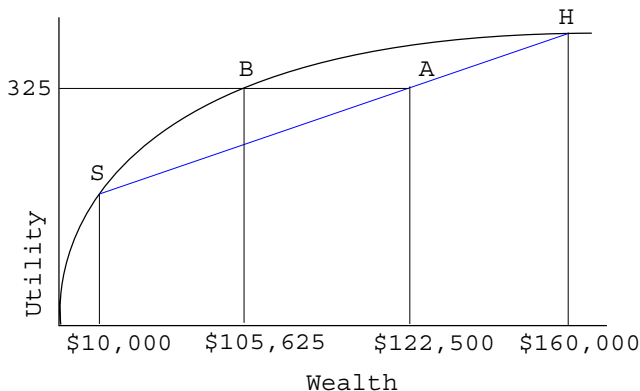
We don't expect insurance to be sold for actuarially fair prices.
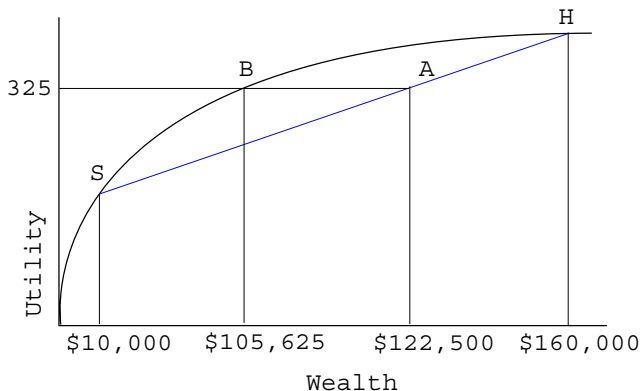How much above this price is he willing to pay?

His expected utility of taking the risk is 325. He can get a utility of 325 for sure if his wealth is \$105,625 (that is, 325^2).

Utility with insurance

So he is willing to pay up to $160,000 - $105,625 = \$54,375$ for insurance.

Utility with insurance

The difference between the actuarially fair price ($122,500) and the most that he is willing to pay ($105,625) is known as the *risk premium*. Here, the risk premium is $16,875.