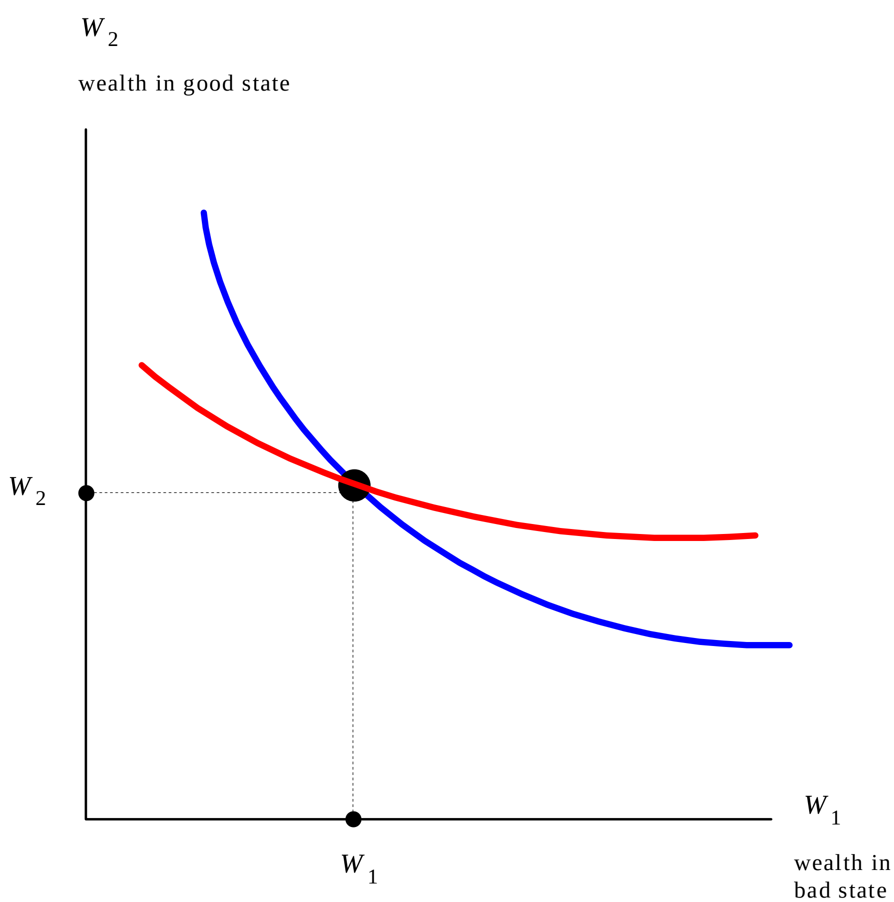
Adverse selection in insurance markets

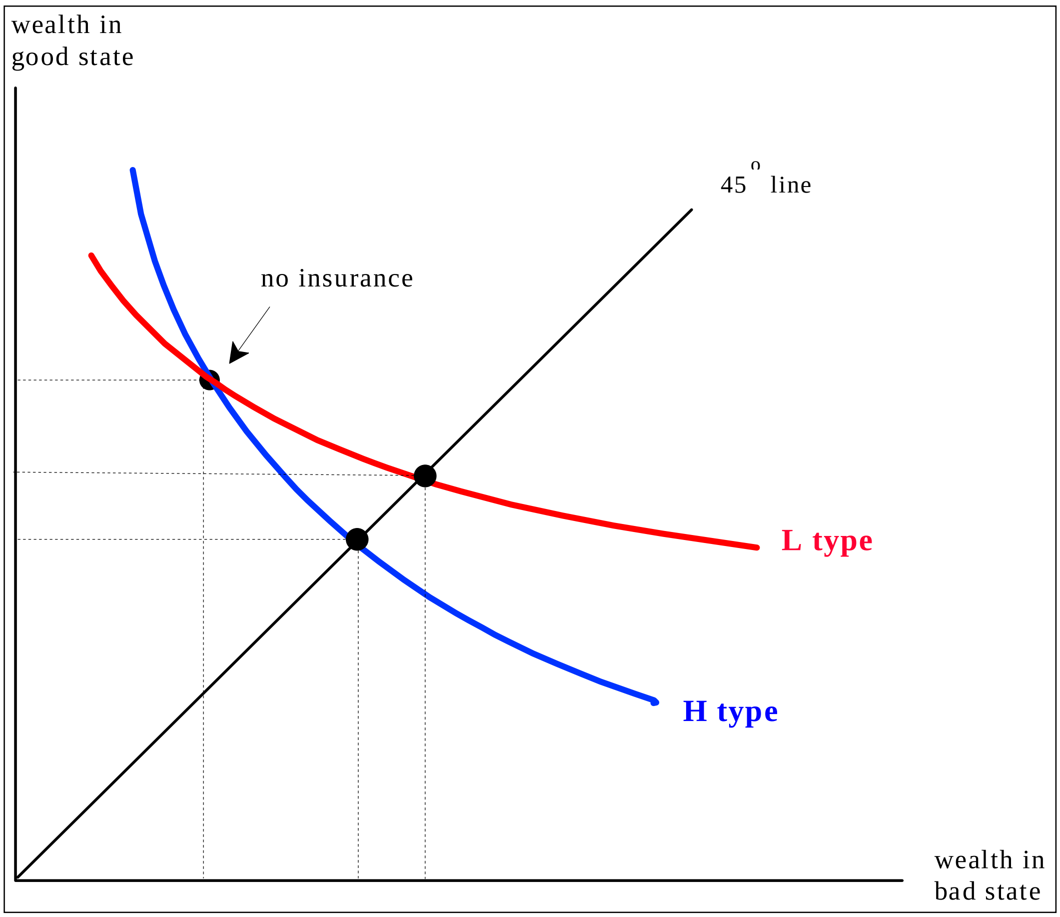
Two types of customers, *H* and *L*, identical in terms of initial wealth *W*, potential loss *L* and vNM utility-of-money function *U*, but with different probability of loss: $\boxed{p_H > p_L}$.

Slope of indifference curves at point (w_1, w_2)



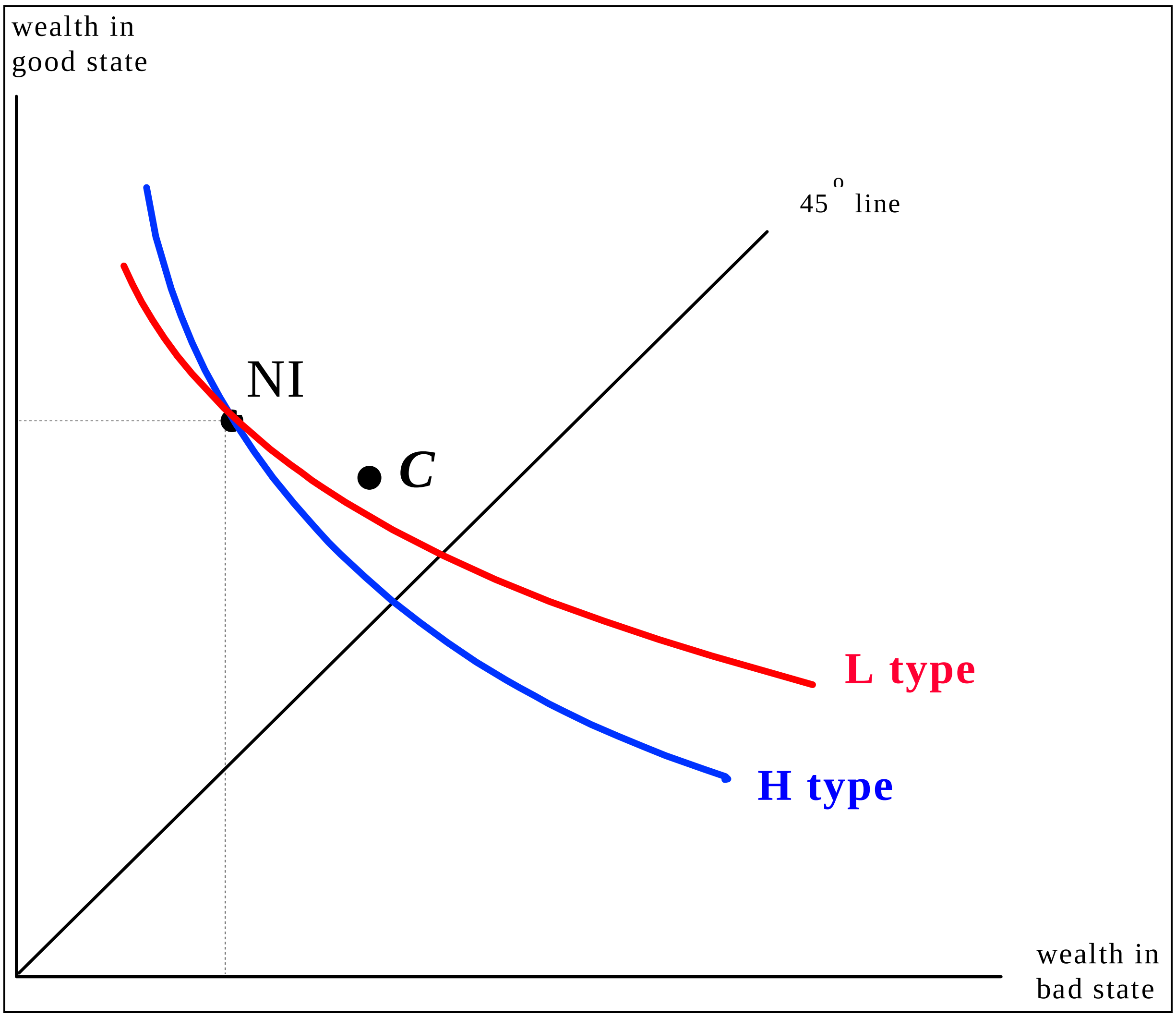
h_H^* maximum premium that the *H* people are willing to pay for full insurance

h_L^* maximum premium that the *L* people are willing to pay for full insurance:



Let q_H be the fraction of *H* types in the population $0 < q_H < 1$

$$\text{If } \mathbb{E}[U_L(C)] \geq \mathbb{E}[U_L(NI)] \text{ then } \mathbb{E}[U_H(C)] \geq \mathbb{E}[U_H(NI)]$$

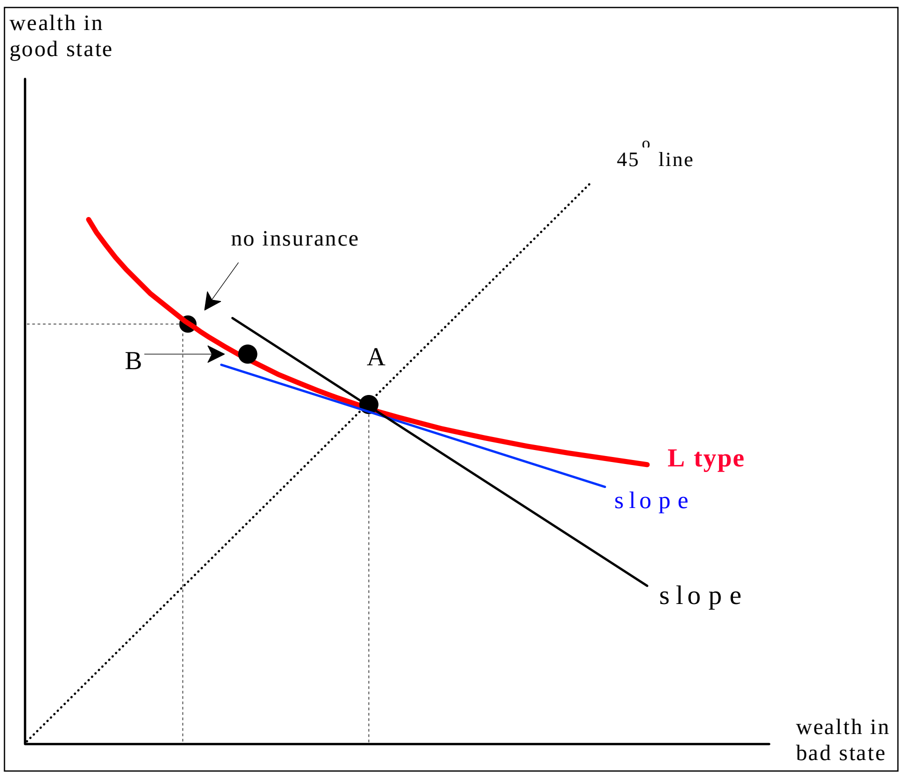


Case 1: **MONOPOLY**

OPTION 1. Offer only one contract, which is attractive only to the H type.

$C_1 = (\quad , \quad)$ Profits: $\pi_1^* =$

OPTION 2. Offer only one contract, which is attractive to both types. **Not optimal to offer full insurance**



Best contract under Option 2:

$\pi_2^* =$

OPTION 3: Offer two contracts,

$C_H = (h_H, d_H)$, targeted to the H type

$C_L = (h_L, d_L)$ targeted to the L type.

expected utility for L-type from C_L: $EU_L[C_L] =$

expected utility for L-type from C_H: $EU_L[C_H] =$

expected utility for H-type from C_L: $EU_H[C_L] =$

expected utility for H-type from C_H: $EU_H[C_H] =$

expected utility for L-type from NI: $EU_L[NI] =$

expected utility for L-type from NI: $EU_H[NI] =$

Monopolist's problem is to

$$\underset{h_H, D_H, h_L, D_L}{Max} \ \pi_3 = q_H N\left[h_H - p_H(x - D_H)\right] + (1 - q_H)N\left[h_L - p_L(x - D_L)\right]$$

subject to

(IR_L)

(IC_L)

(IR_H)

(IC_H)

(IR_H) follows from (IR_L) and (IC_H)

Thus, the problem can be reduced to

$$\underset{h_H, D_H, h_L, D_L}{Max} \ \pi_3 = q_H N\left[h_H - p_H(x - D_H)\right] + (1 - q_H)N\left[h_L - p_L(x - D_L)\right]$$

subject to

$$(IR_L) \quad EU_L[C_L] \geq EU_L[NI]$$

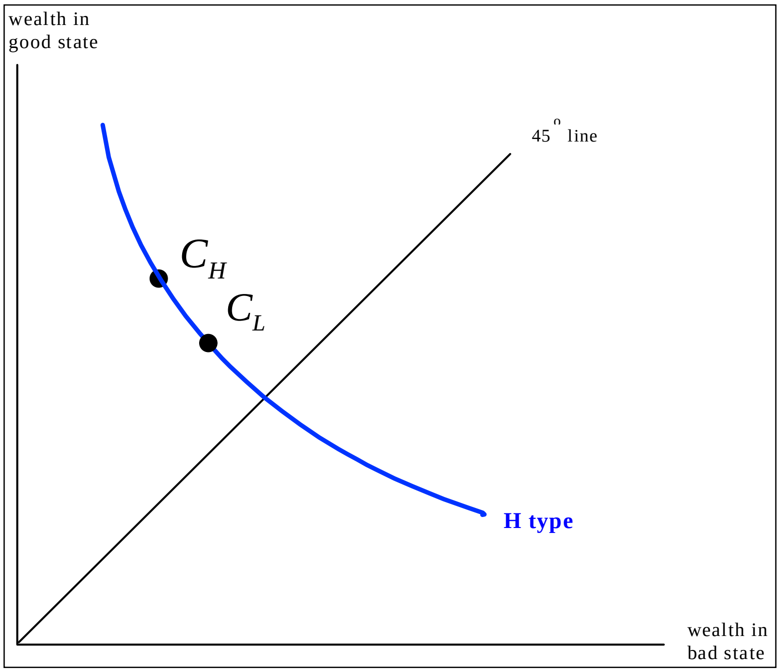
$$(IC_L) \quad EU_L[C_L] \geq EU_L[C_H]$$

$$(IC_H) \quad EU_H[C_H] \geq EU_H[C_L]$$

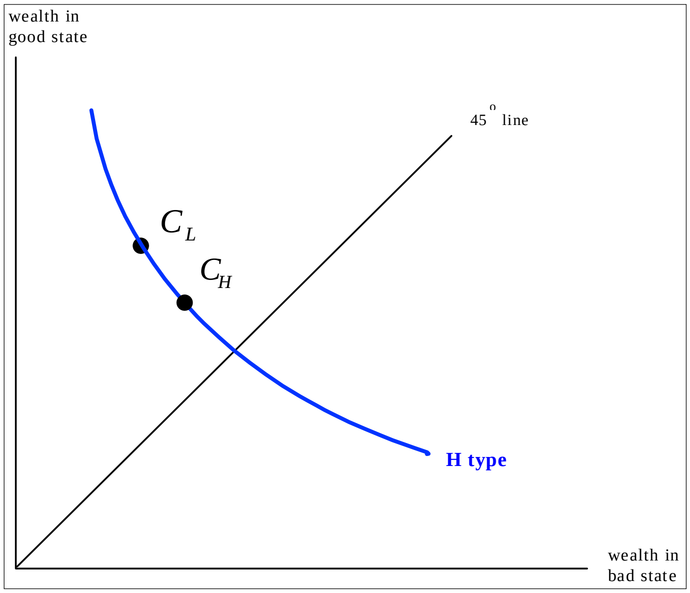
(IC_H) must be satisfied as an equality.

So c_H and c_L be on the same indifference curve for the H type.

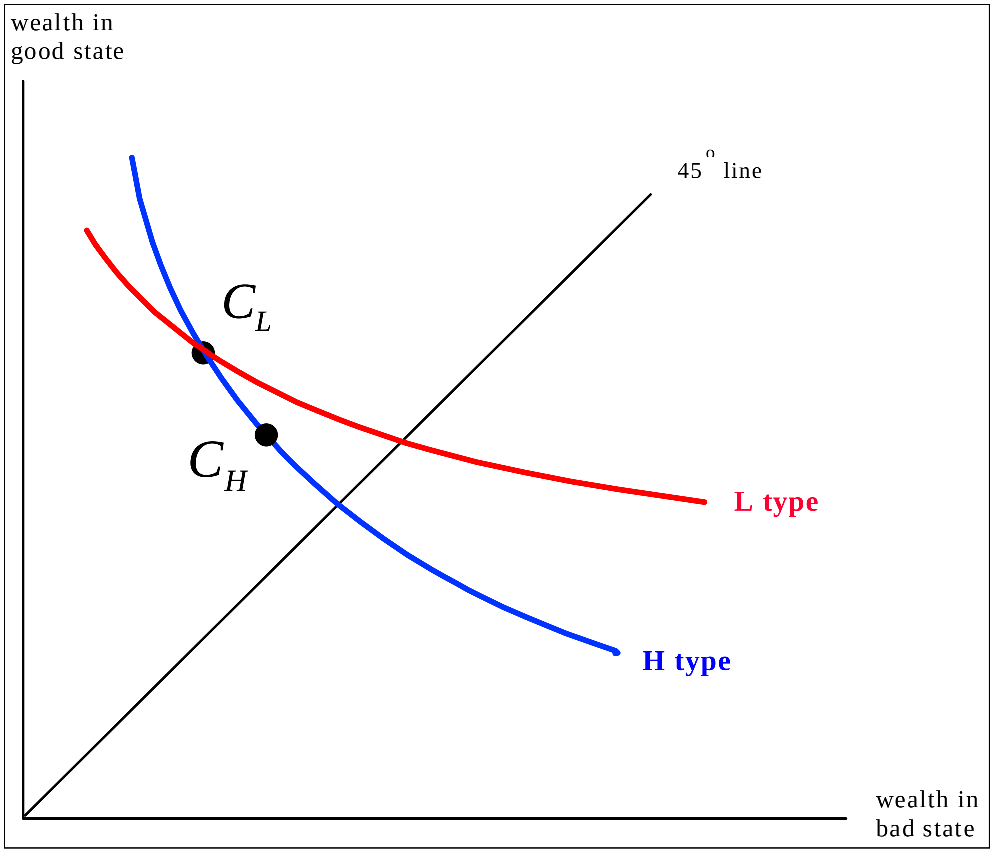
On this indifference curve, contract C_H cannot be above contract C_L



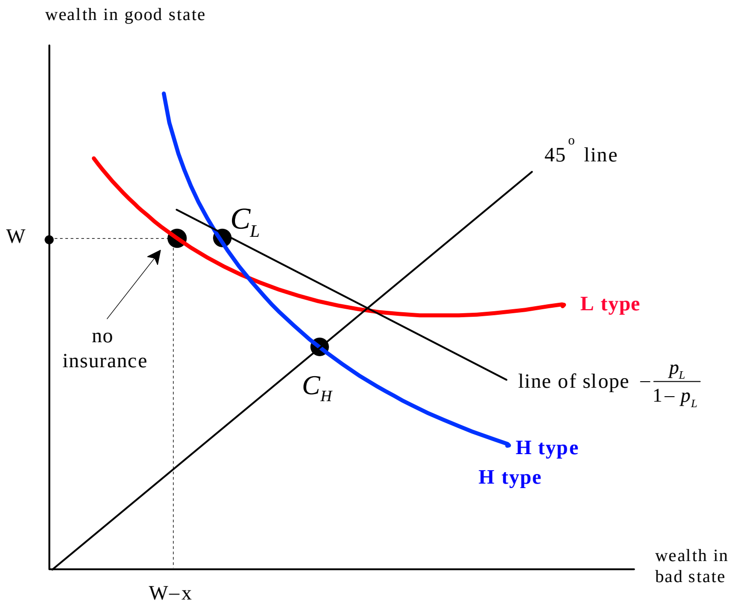
So it must be:

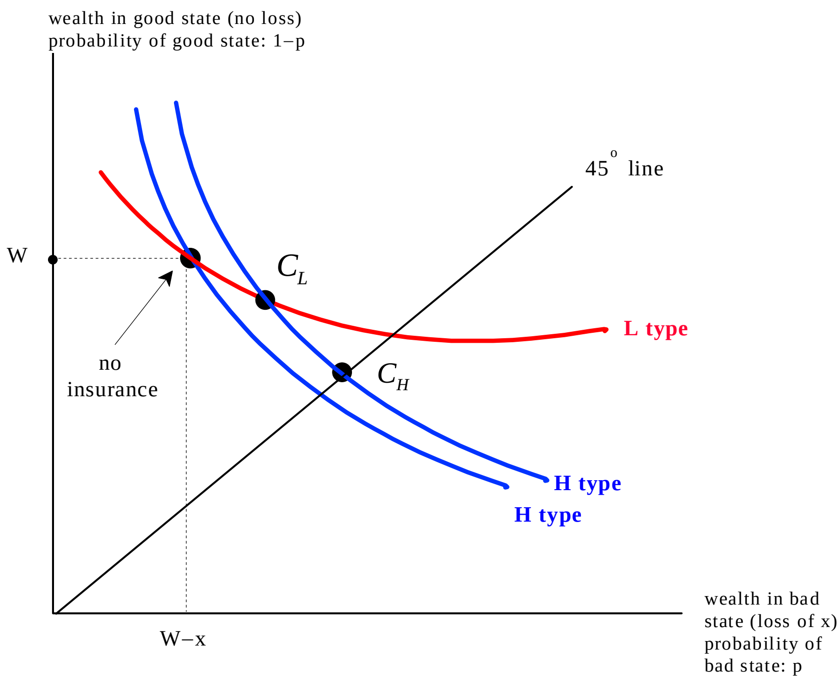


C_H must be a full insurance contract



(IR_L) must be satisfied as an equality.





(IC_L) **is not binding: it is always satisfied as a strict inequality.**