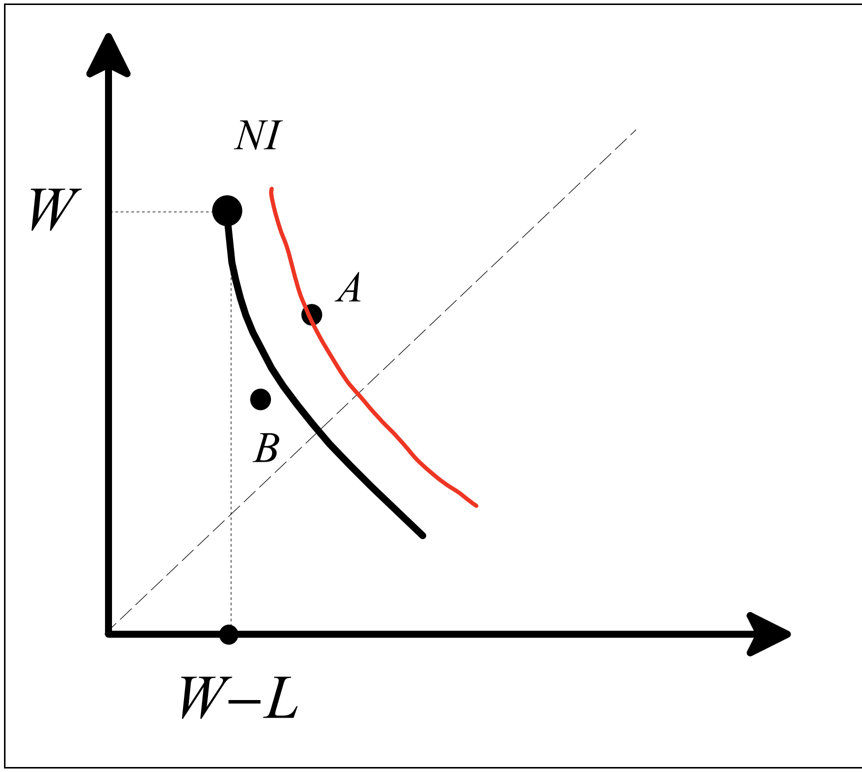
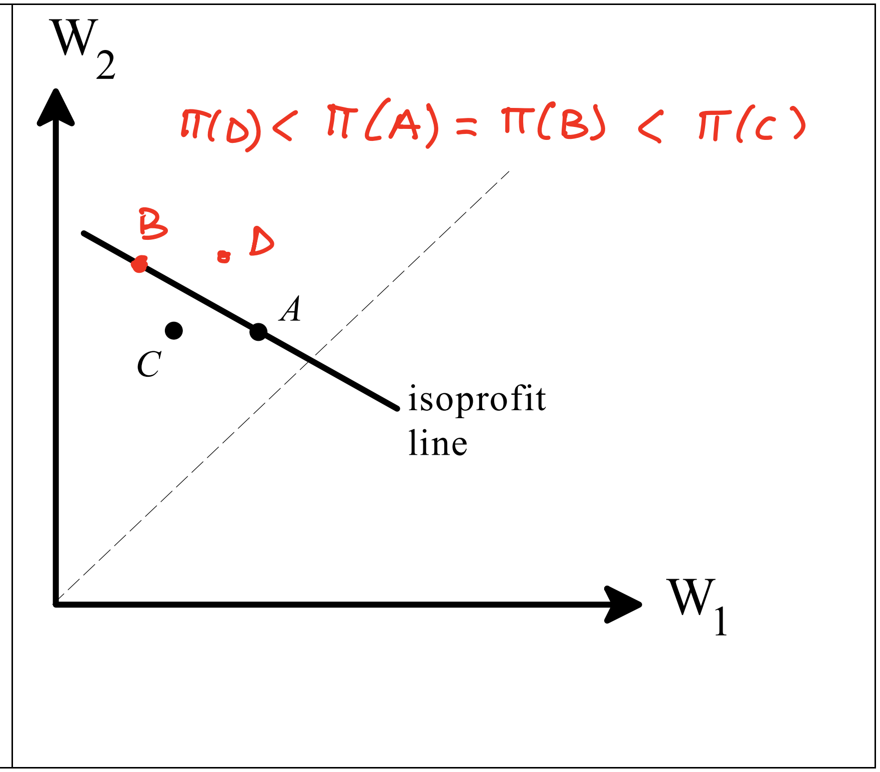
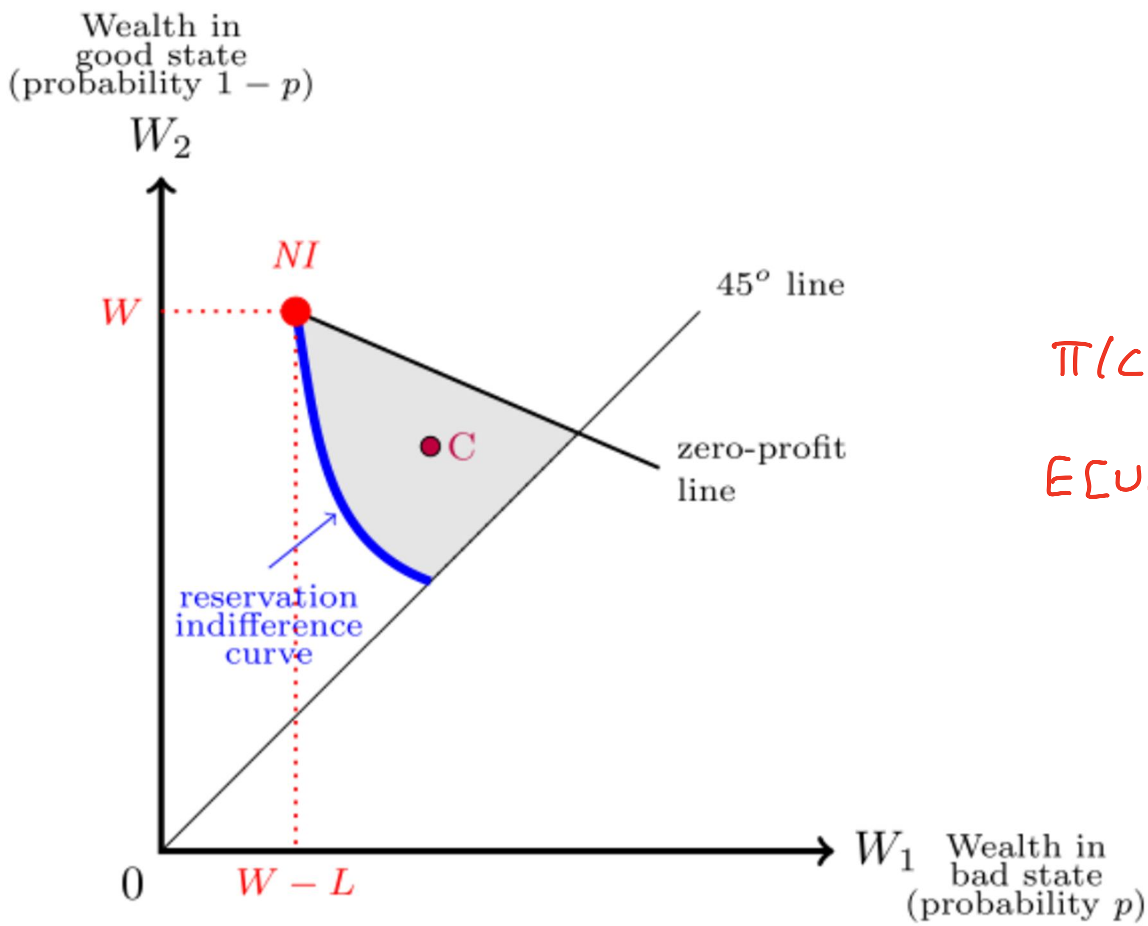
1. Suppose the insurance industry is a monopoly





E[U(B)] < E[U(NI)] < E[U(A)]

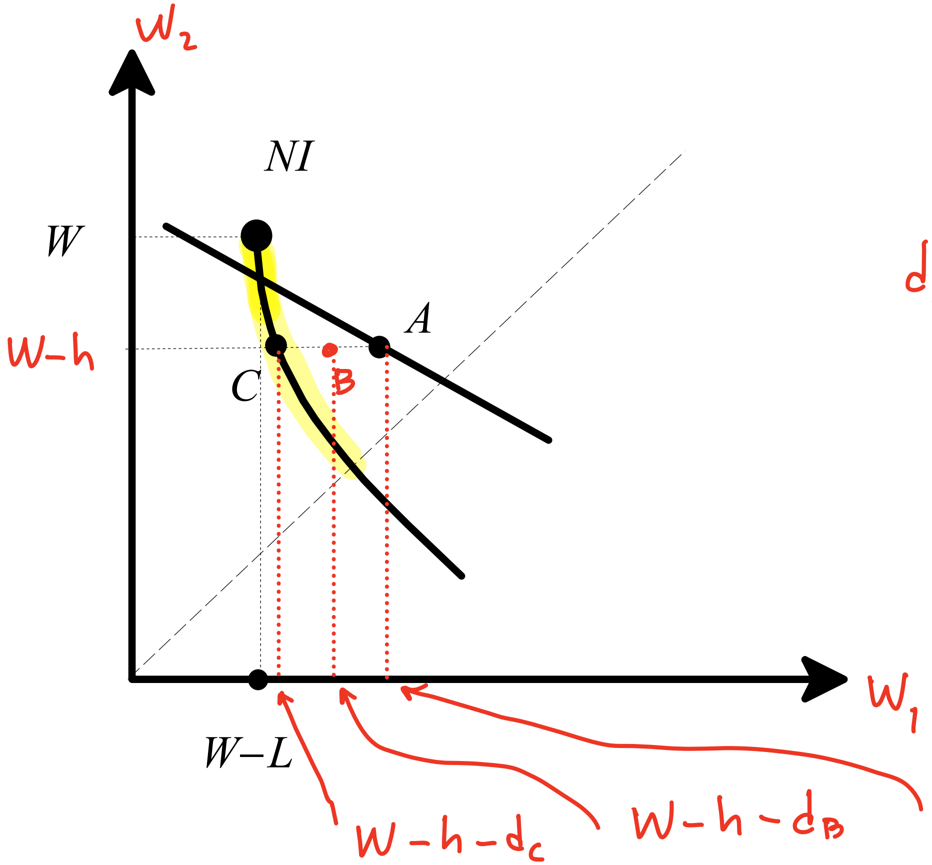
So we must exclude points that are below the indifference curve that goes through NI, called the **reservation indifference curve,** and exclude all those that are above the zero-profit line. The only observable contracts are:



$\pi(C) > 0$

$E[U(C)] > E[U(NI)]$

A monopolist will try to make the consumer pay as much as possible and thus will offer a contract which is **on** the reservation indifference curve and not above it.



$A = (h_A, d_A)$ $\quad$ $B = (h_B, d_B)$

$C = (h_C, d_C)$

$d_A < d_B < d_C$ $\quad$ $h_A = h_B = h_C = h$

$\pi(A) = h - p(L - d_A)$

$\pi(B) = h - p(L - d_B)$

$\pi(C) = h - p(L - d_C)$

Reminder:

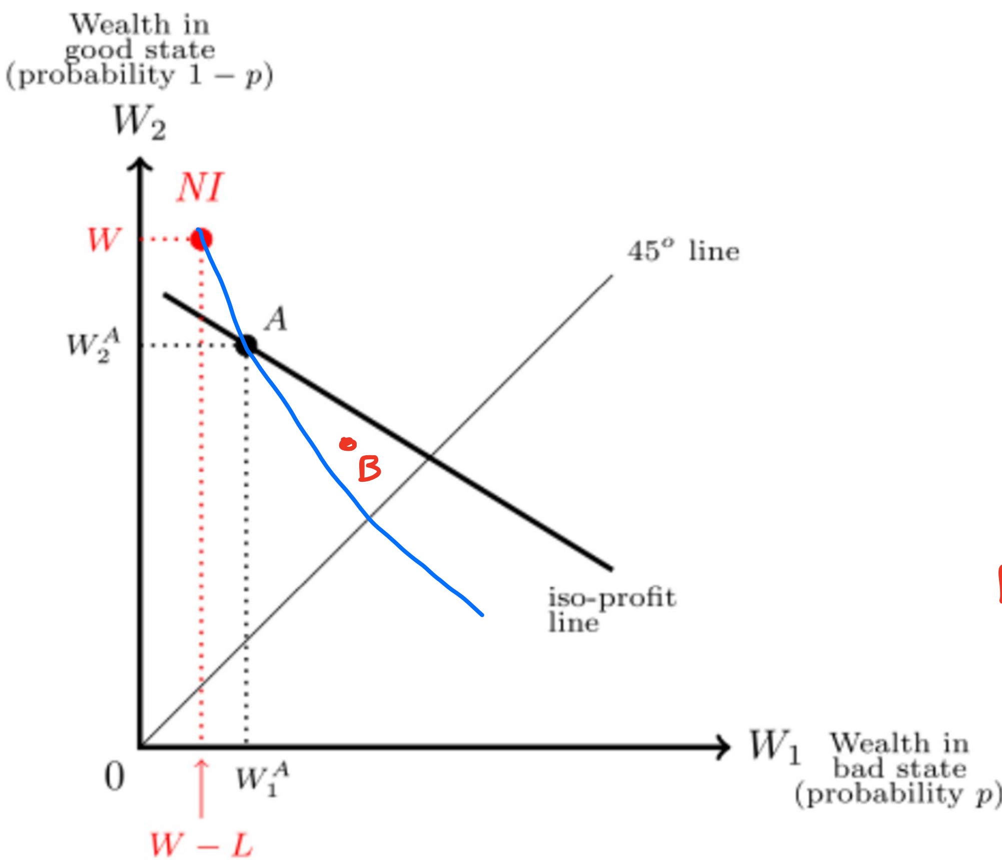
The absolute value of the slope of the indifference curve that goes through point $A = \left(W_1^A, W_2^A\right)$ is

$$\frac{p}{1-p}\,\frac{U'(W_1^A)}{U'(W_2^A)}$$

$> \frac{p}{1-p}$ above 45° line

$= \frac{p}{1-p}$ on 45° line

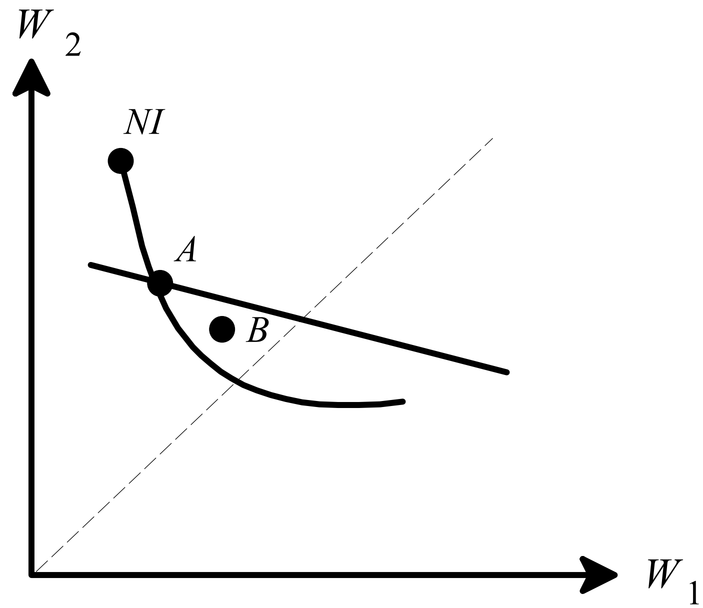
absolute value of slope of any isoprofit line at any point is $\frac{p}{1-p}$



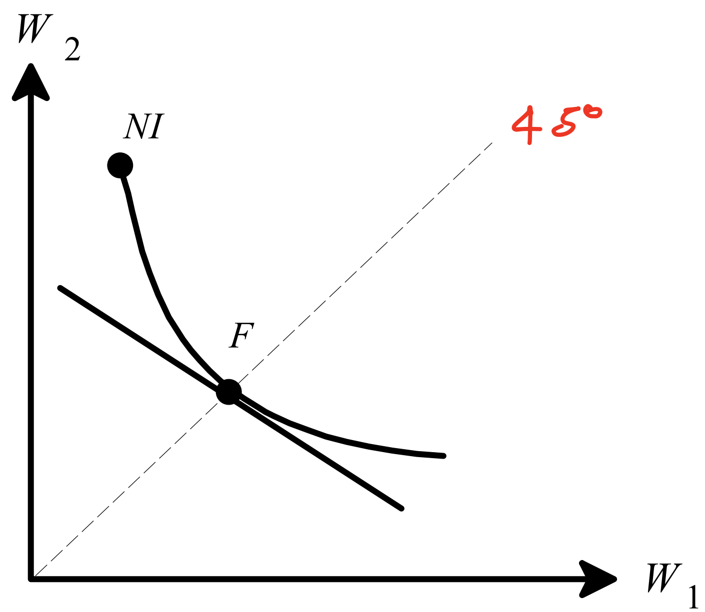
$\pi(B) > \pi(A)$

$E[U(B)] > E[U(NI)]$

Contract *A* on the reservation indifference curve cannot be profit-maximizing because …



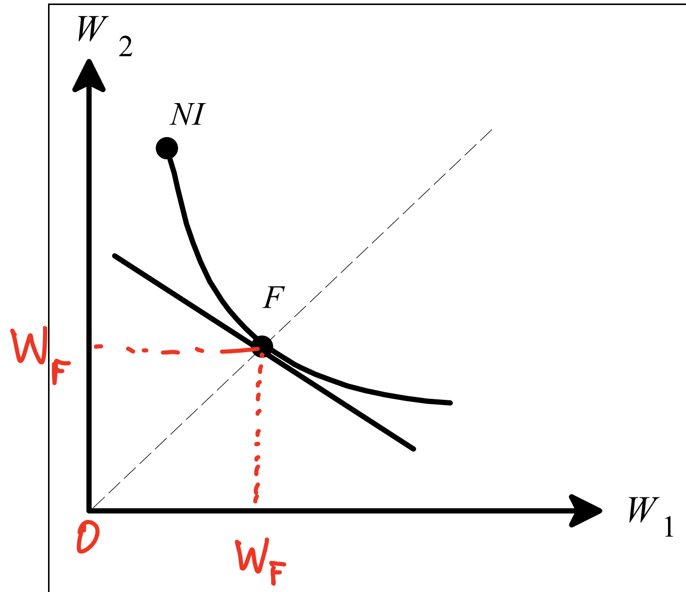
The only contract on the reservation indifference curve where this cannot happen is the contract at the intersection of the reservation indifference curve and the 45° line: contract *F* below:



Profit-maximizing contract is

$F = (h_F, d_F = 0)$

Full insurance



Let W_F be the horizontal (and vertical) coordinate of point F.

$$W_F = W - h_F \qquad (1)$$

$$U(W_F) = E[U(NI)] \qquad (2)$$

$$NI = \begin{pmatrix} W-L & W \\ p & 1-p \end{pmatrix}$$

Expected **value:** $E[NI] = p(W-L) + (1-p)W = W - pL$

$$\mathbb{E}[NI] = W - pL$$

Then from the definition of risk premium, Solution to $U(\underbrace{W - pL - R}_{W_F}) = E[U(NI)]$ (3)

$$W_F = W - (\underbrace{pL + R_{NI}}_{h})$$

$$W_F = W - h_F$$

Thus from (1)-(3) we get that

$$\boxed{h_F = pL + R_{NI}}$$

If consumer A is less risk averse than consumer B (put W, L, p same)

$R_{NI}^{A} < R_{NI}^{B}$, that is, $\boxed{h_F = pL + R_{NI}}$ so $h_F^A < h_F^B$

Thus the monopolist will offer a full-insurance contract with premium equal to expected loss + risk premium of NI.

For example, if $W = 1{,}600$, $L = 700$, $p = \frac{1}{10}$ and $U(\$m) = \sqrt{m}$ then h_F is given by the solution to

$pL = \frac{1}{10} \cdot 700 = 70$ $\qquad E[NI] = W - pL = 1600 - 70$

$$\sqrt{1600 - 70 - R} = \underbrace{\frac{1}{10}\sqrt{1600 - 700} + \frac{9}{10}\sqrt{1600}}_{= 39}$$

which is $h_F = pL + R_{NI} = 70 + 9 = 79$ Since $pL = 70$

it follows that $R_{NI} = 9$

2. Suppose the insurance industry is perfectly competitive and there is free entry

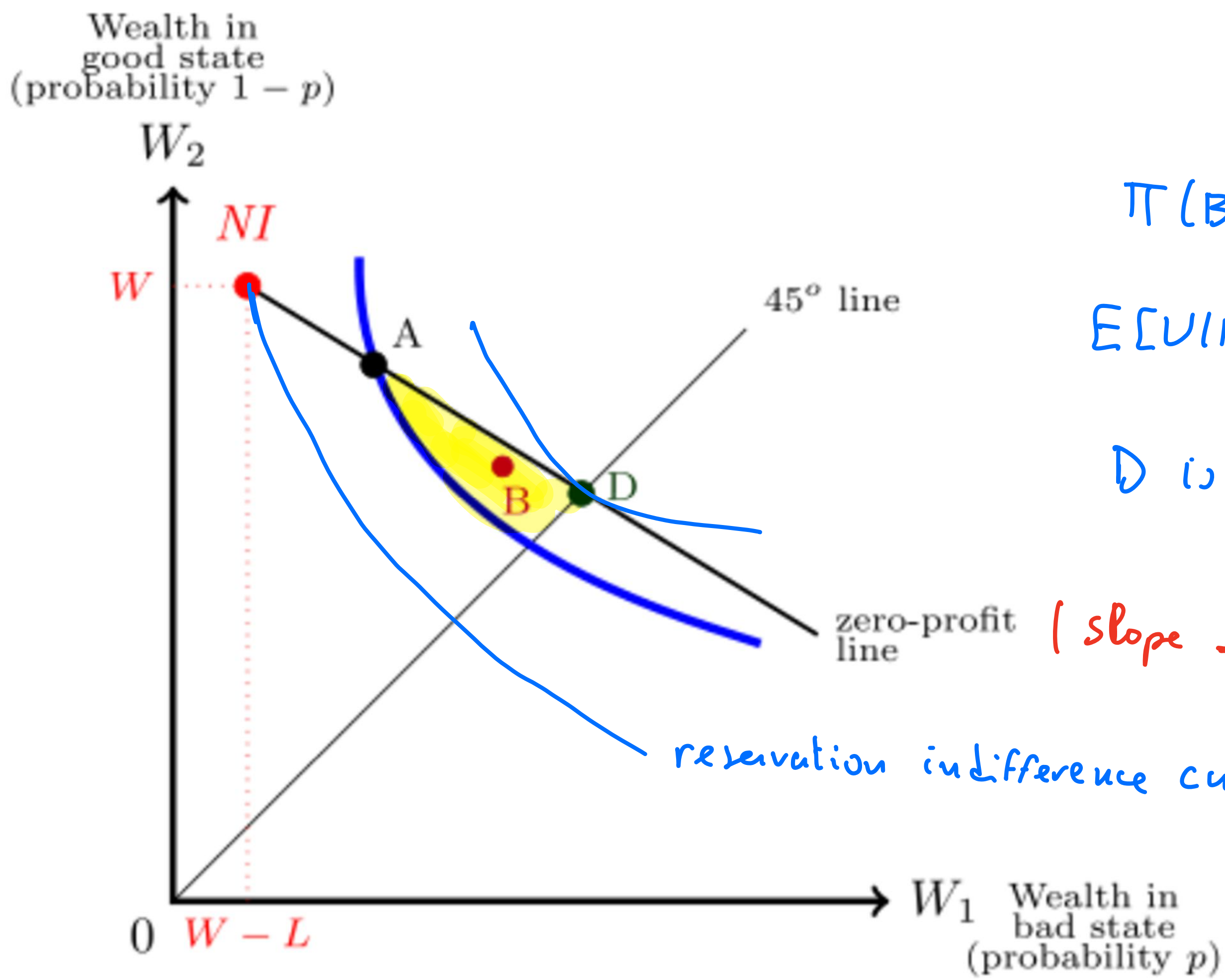
A contract that yields zero profit is called a **fair contract** and the zero profit line is called the **fair odds line**. Recall that the zero profit line is the straight line that goes through the No Insurance point and has slope $-\frac{p}{1-p}$.

Define an equilibrium in a competitive insurance industry with free entry **as a situation where**

(1) **every firm makes zero profits and** → contract(s) offered are on the zero-profit line

(2) **no firm (existing or new) can make positive profits by offering a new contract.**

By the zero-profit condition (1), any equilibrium contract must be on the zero-profit line.



$\pi(B) > \pi(A) = 0$

$E[U(B)] > E[U(A)]$

D is the only equilibrium contract

(slope $-\frac{p}{1-p}$)

$D = (h_D, d_D = 0)$

$\pi(D) = h_D - pL = 0$

$h_D = pL$

$h_D < h_F$

$$d_D = 0 \text{ and } h_D = pL$$

in the case of monopoly: $h_F = pL - R_{NI}$

CHOOSING FROM A MENU OF CONTRACTS

1. Finite menu of contracts

$W = 900,\ L = 700,\quad p = \frac{1}{50},\quad U(m) = \sqrt{m}$

	premium	*deductible*
A	90	0
B	60	100
C	55	500

$$\mathbb{E}[U(A)] = \frac{1}{50}\sqrt{900-90} + \frac{49}{50}\sqrt{900-90} = \sqrt{900-90} = 28.46$$

$$\mathbb{E}[U(B)] = \frac{1}{50}\sqrt{900-60-100} + \frac{49}{50}\sqrt{900-60} = 28.95$$

$$\mathbb{E}[U(C)] = \frac{1}{50}\sqrt{900-55-500} + \frac{49}{50}\sqrt{900-55} = 28.86$$

$$\mathbb{E}[U(NI)] = \frac{1}{50}\sqrt{900-700} + \frac{49}{50}\sqrt{900} = 29.68$$

$NI \succ B \succ C \succ A$