uncertainty

1 = RAIN
2 = SUN

x_1 , x_2

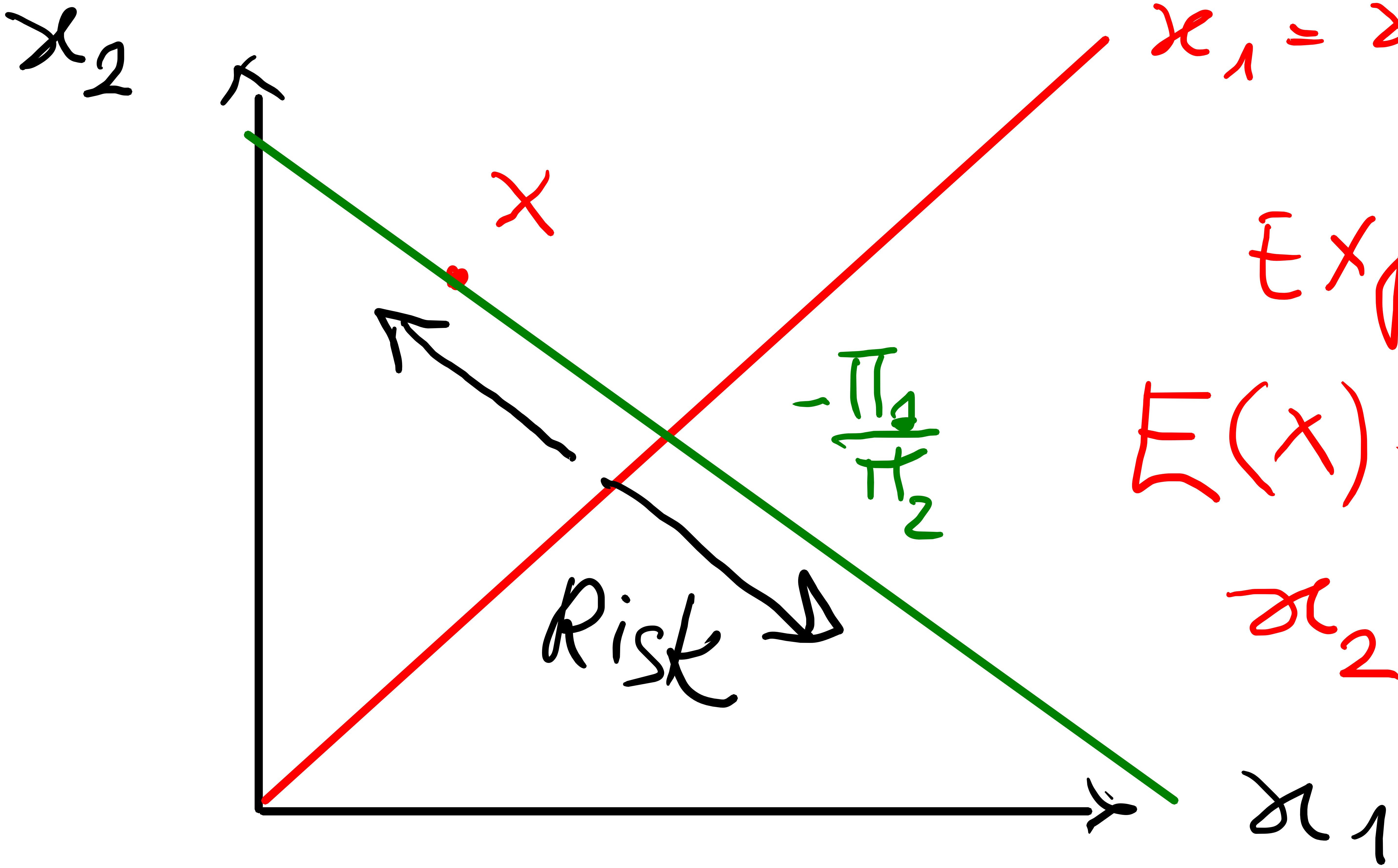
x_1 contingent on event 1

x_2 contingent on event 2

$\pi_1 \qquad \pi_2 = (1 - \pi_1)$

$u(x_1, x_2, \pi_1, \pi_2)$

CONSUMPTION IS CONTINGENT UPON THE OCCURENCE OF RANDOM AND MUTUALLY EXCLUSIVE EVENTS THAT REALIZE WITH KNOWN PROBABILITIES.
THE ARGUMENT OF THE UTILITY FUNCTION IS A CONTINGENT CONSUMPTION BUNDLE



$x_1 = x_2$ = WARRANTED consumption

Expected consumption

$$E(X) = x_1 \cdot \pi_1 + x_2 (1-\pi_1)$$

$$x_2 = \frac{E(X)}{1-\pi_1} - \frac{\pi_1}{\pi_2} \cdot x_1$$

THE GREEN STRAIGNT LINE THROUG X IS CALLED THE Constant expected consumpt straight line

BUDGET LINE: DESCRIBES THE AVAILABLE OPPORTUNITIES TO TRANSFER CONSUMPTION FROM STATE 1 TO STATE 2 or vice versa

$w_1 = w_2 = w$ 100 Euro $= w$ = endowment of Sun money

$p_{x_1} = p_{x_2} = 1$ = money price of consumption

$1 \; L_A$ < 2 if Rain / 0 if Sun

LOTTERY A

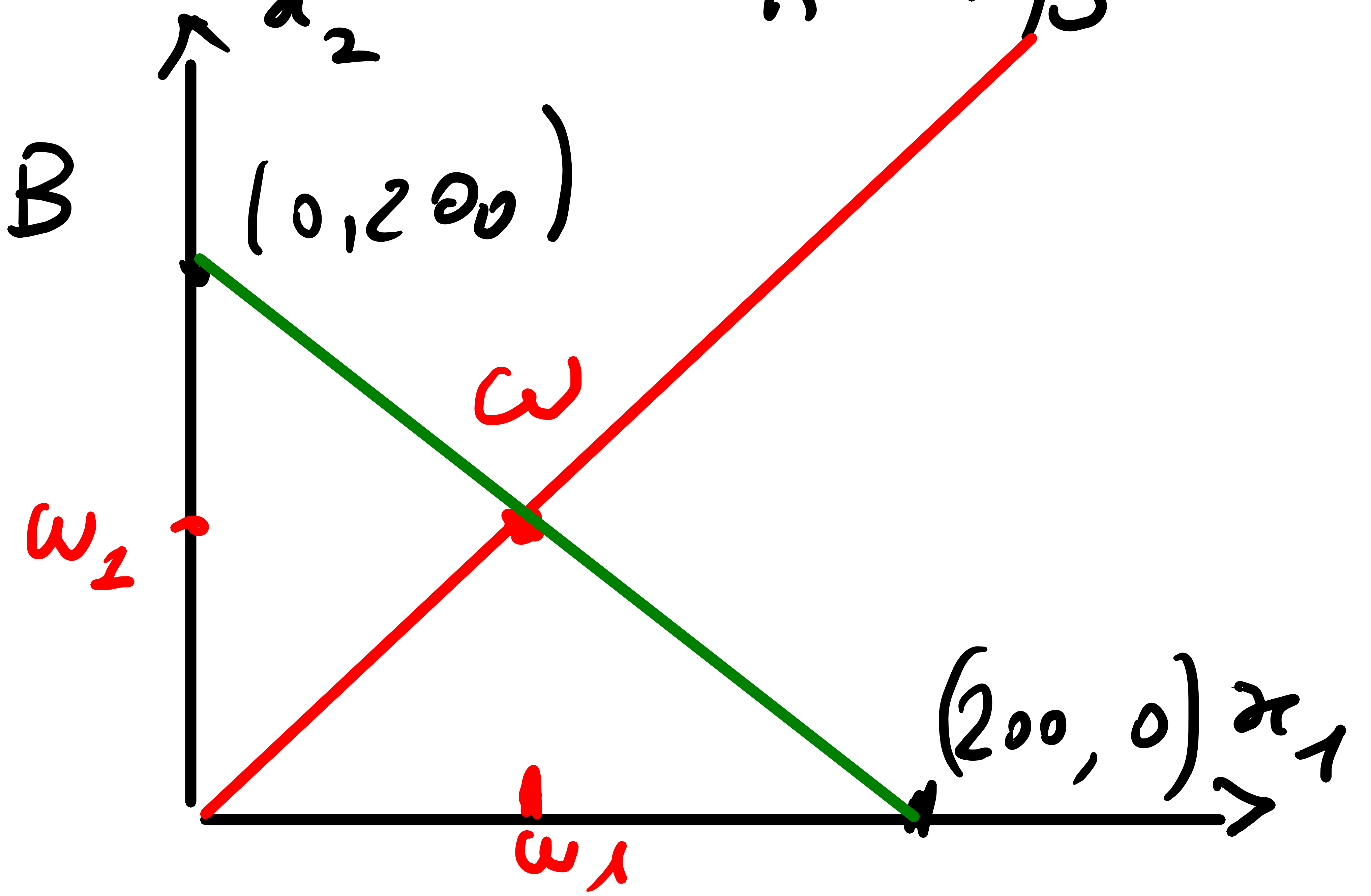
$1 \; L_B$ < 0 if rain / 2 if sun

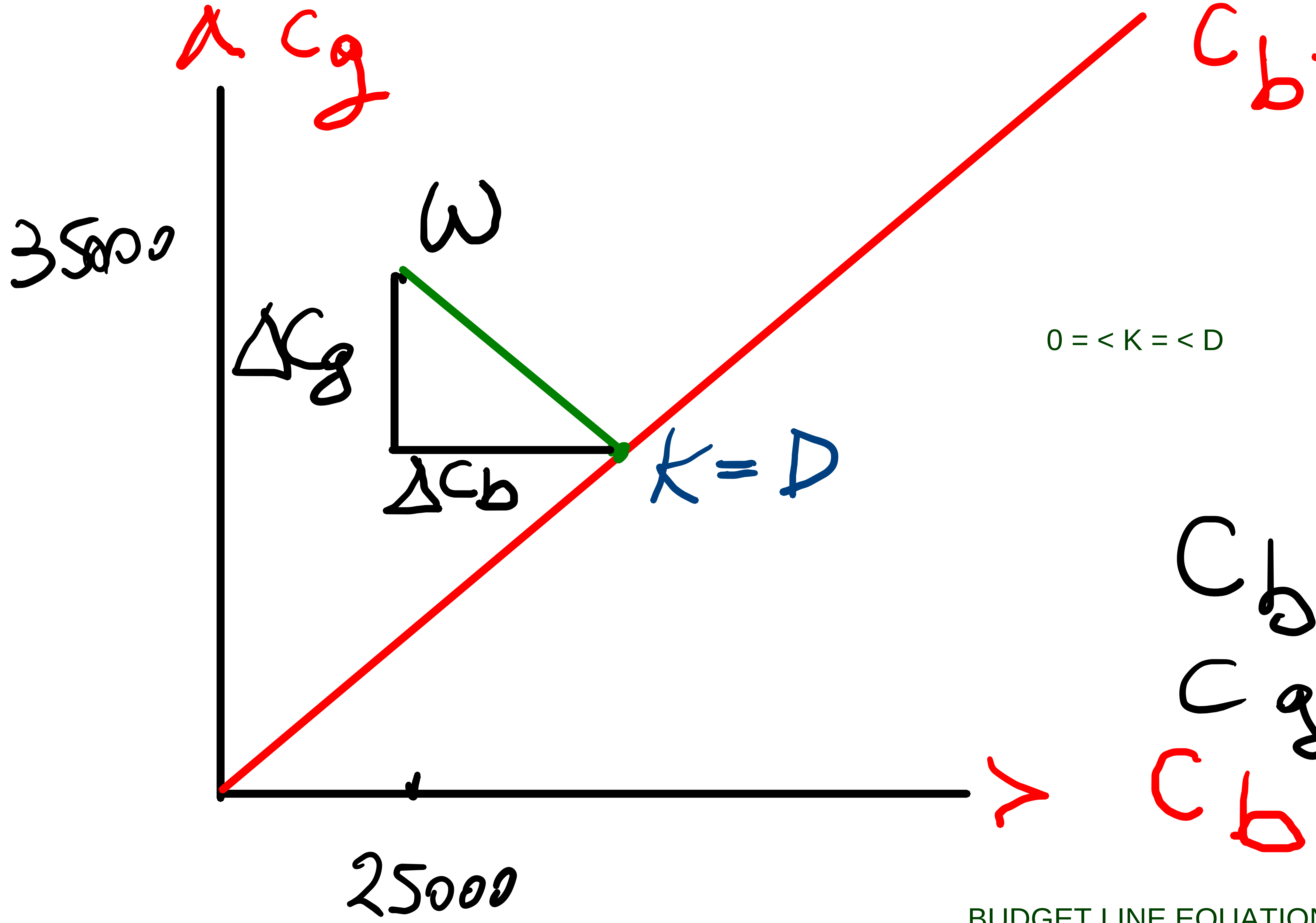
LOTTERY B

$$x_1 = 2x_A + w_1 - p_A x_A - p_B x_B \quad \text{if } p_A = p_B = 1$$

$$x_2 = 2x_B + w_2 - p_A x_A - p_B x_B$$

$$\frac{x_2 - w_2}{x_1 - w_1} = \text{slope of budget line}$$





INSURANCE PROBLEM: WEALTH IS RISKY. IT IS 25000 IN STATE b AND 35000 IN STATE g

DAMAGE D = 35000 - 25000 = 10000

K insurance

γK premium (total)

$0 =< K =< D$

$$c_b = \omega_b + K - \gamma K$$

$$c_g = \omega_g - \gamma K$$

BUDGET LINE EQUATION:

$$K_{max} = \omega_g - \omega_b = D$$

$$-\frac{\gamma}{1-\gamma} = \frac{c_g - \omega_g}{c_b - \omega_b} = \frac{-\gamma K}{(1-\gamma)K}$$

SLOPE

EXPECTED PROFIT OF INSURANCE COMPANY

$$\gamma K - (K\pi_1 + 0 \cdot \pi_2) = E(\pi)$$

Revenue of insurance company

'costs'

Exp. profit of insur. company

if $\gamma = \pi_1 \Rightarrow E(\pi) = 0$

if $\gamma = \pi_1$ premium is 'fair'

IN THE LONG RUN, THE ENTRY OF FIRMS IN THE INSURANCE SECTOR DRIVES THE PROFIT TO ZERO AND MAKES THE PREMIUM 'FAIR' (WE MAKE ABSTRACTION FROM ADMINISTRATION COSTS)

$$u(C_b, C_g, \pi_b, \pi_g) = C_b \cdot \pi_b + C_g \cdot \pi_g$$

PERFECT-SUBSTITUTES UTILITY FUNCTION: WE SHALL SEE THAT IT DESCRIBES NEUTRALITY WITH RESPECT TO RISK

$$|MRS| = \frac{MU_b}{MU_g} = \frac{\pi_b}{\pi_g}$$

$$u(C_b, C_g, \pi_b, \pi_g) = C_b^{\pi_b} \cdot C_g^{\pi_g}$$

$$|MRS| = \frac{\pi_b}{\pi_g} \cdot \frac{C_g}{C_b} \qquad MU_b = \pi_b \cdot \frac{C_b^{\pi_b} C_g^{\pi_g}}{C_b}$$

WITH COBB-DOUGLAS UTILITY, MARGINAL UTILITY OF Cb depends on Cg, the consumption in the state that does not occur

Independence property

Marginal utility of consumption in one state is independent from consumption in the states that do not occur.

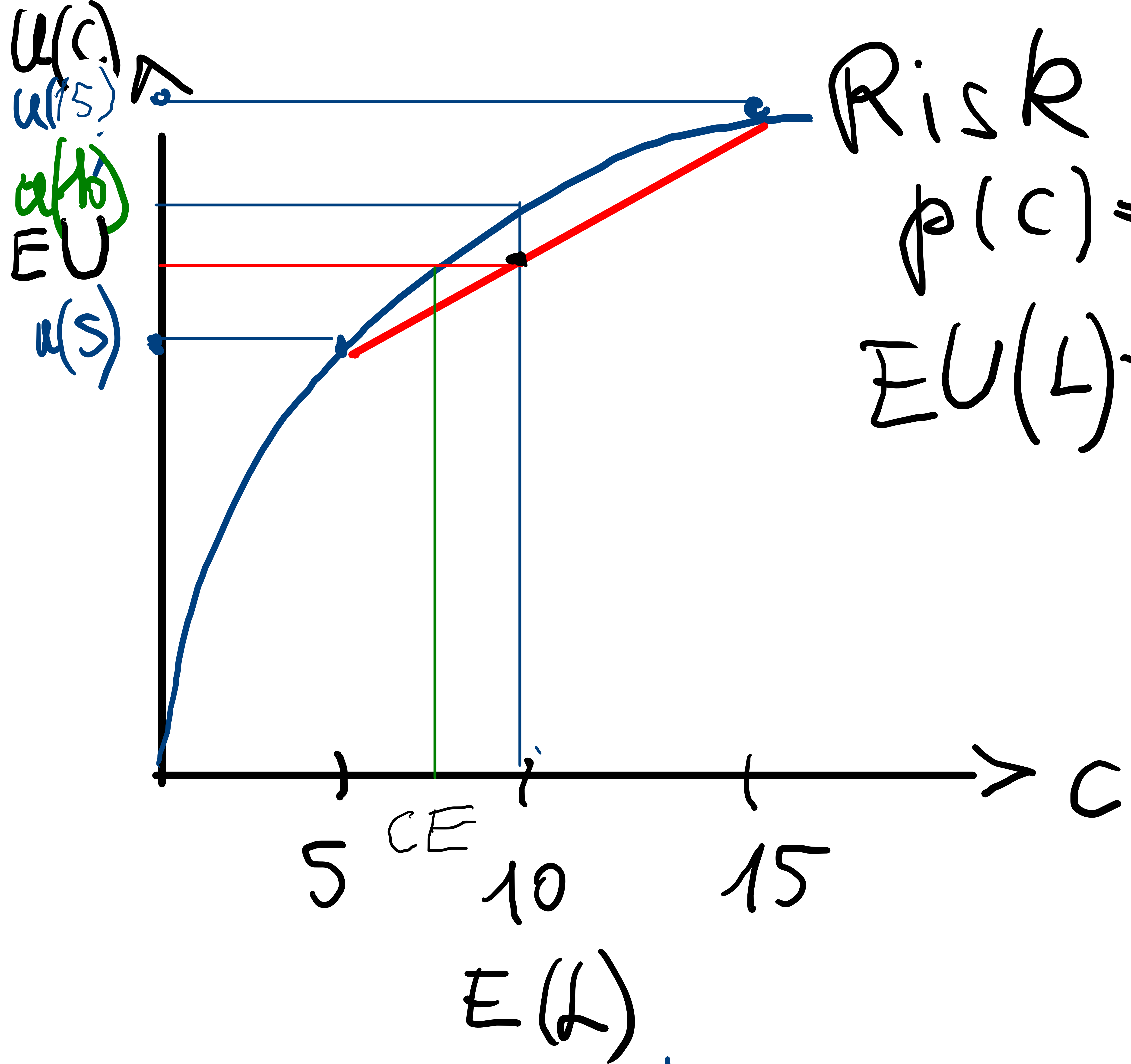
(No Regret)

Expected Utility: meets independence property

$$EU(C_1, C_2, \pi_1, \pi_2) = \pi_1 \cdot u(C_1) + \pi_2 \cdot u(C_2)$$

$$MU_1 = \pi_1 \cdot u'(C_1) \quad MU_2 = \pi_2 \cdot u'(C_2)$$

Risk aversion



$p(c) = 1$

$$EU(L) = \pi_1 \cdot u(c_1) + \pi_2 u(c_2)$$

15 state 1

5 state 2

$$\pi_1 = \pi_2 = 1/2$$

$$E(L) = \pi_1 \cdot 15 + \pi_2 5 = 10$$

$$u(10) = u(E(L))$$

slope : $u'(c)$ = marg. util. consumpt.

$$EU(L) < U(E(L))$$

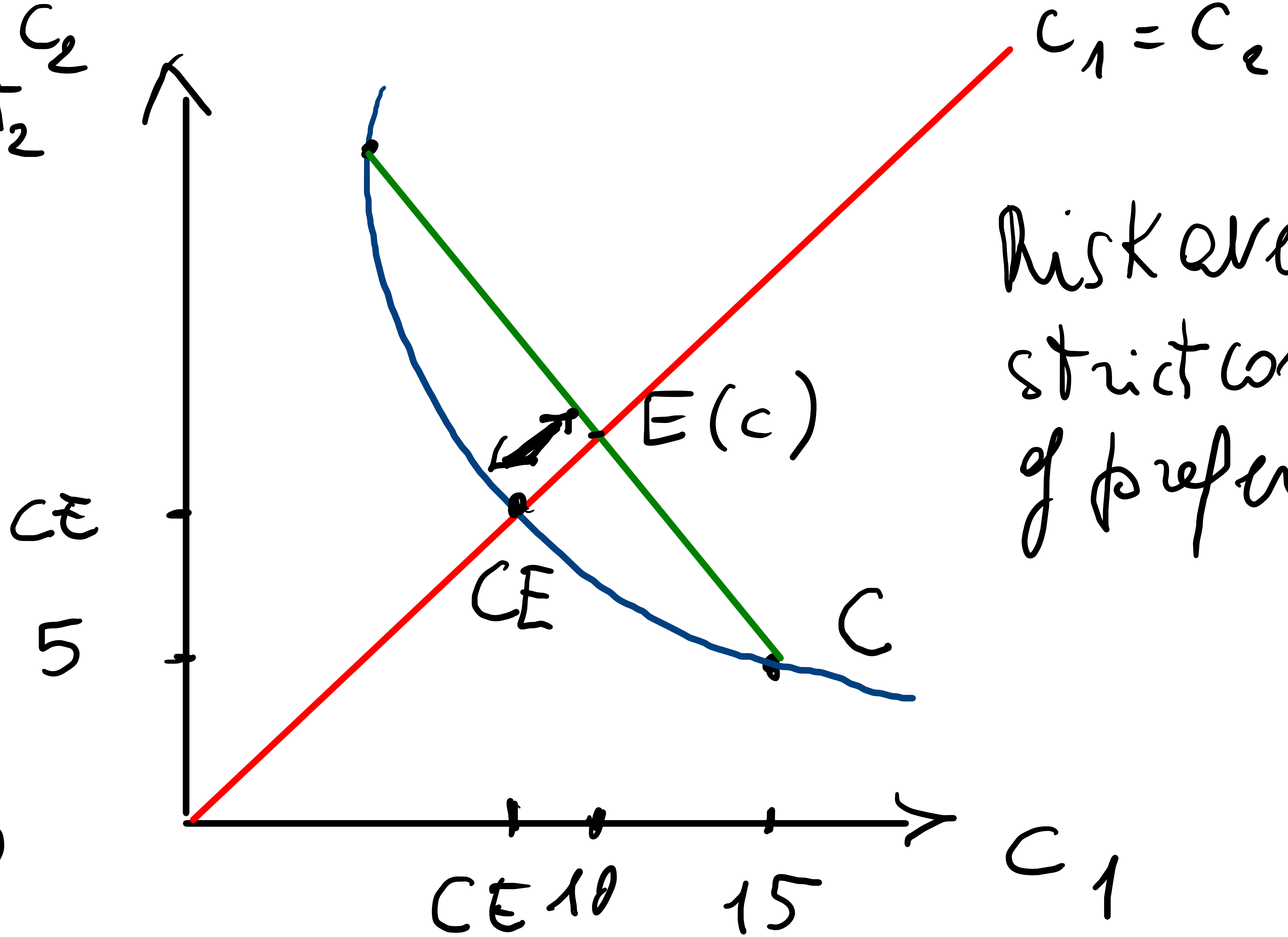
$CE = x$ s.t. $u(x) = EU(L)$

Risk Premium :

Consider a consumer with sure money $CE(L)$. The risk premium is the minimum change in expected consumption necessary to induce the consumer to hold the risky asset L $\implies E(L) > CE(L)$ if RISK averse $E(L) - CE(L) =$ RISK PREMIUM

$$EU = u(c_1)\cdot\pi_1 + u(c_2)\cdot\pi_2$$

$$|MRS| = \frac{\pi_1 \cdot u'(c_1)}{\pi_2 \cdot u'(c_2)}$$



Risk aversion: strict convexity of preferences

Risk Premium:

$$E(c) - CE > 0$$

Risk aversion