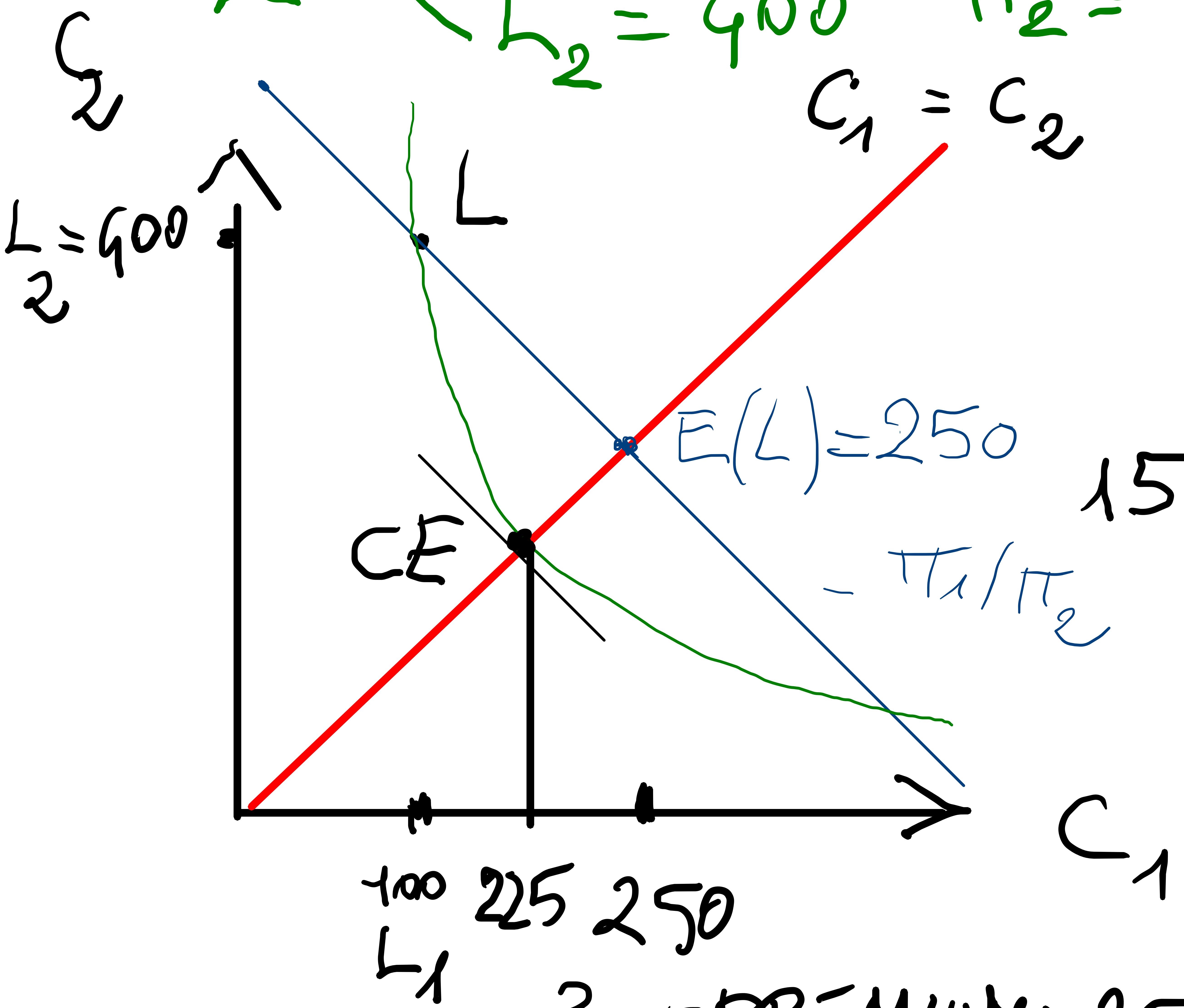
EXERCISE ON RISK PREMIUM

$p_c = 1$

$$L = \begin{cases} L_1 = 100 & \pi_1 = 1/2 \\ L_2 = 400 & \pi_2 = 1/2 \end{cases}$$

$$u(c) = c^{1/2}$$

$$u'(c) = \frac{1}{2} c^{-1/2}$$



minimum price of wich agent would sell $L = 225$

$$15 = EU(L) = \pi_1 \cdot u(c_1) + \pi_2 u(c_2)$$

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

$$u(CE) = EU(L) = CE^{1/2}$$

$$CE = 225$$

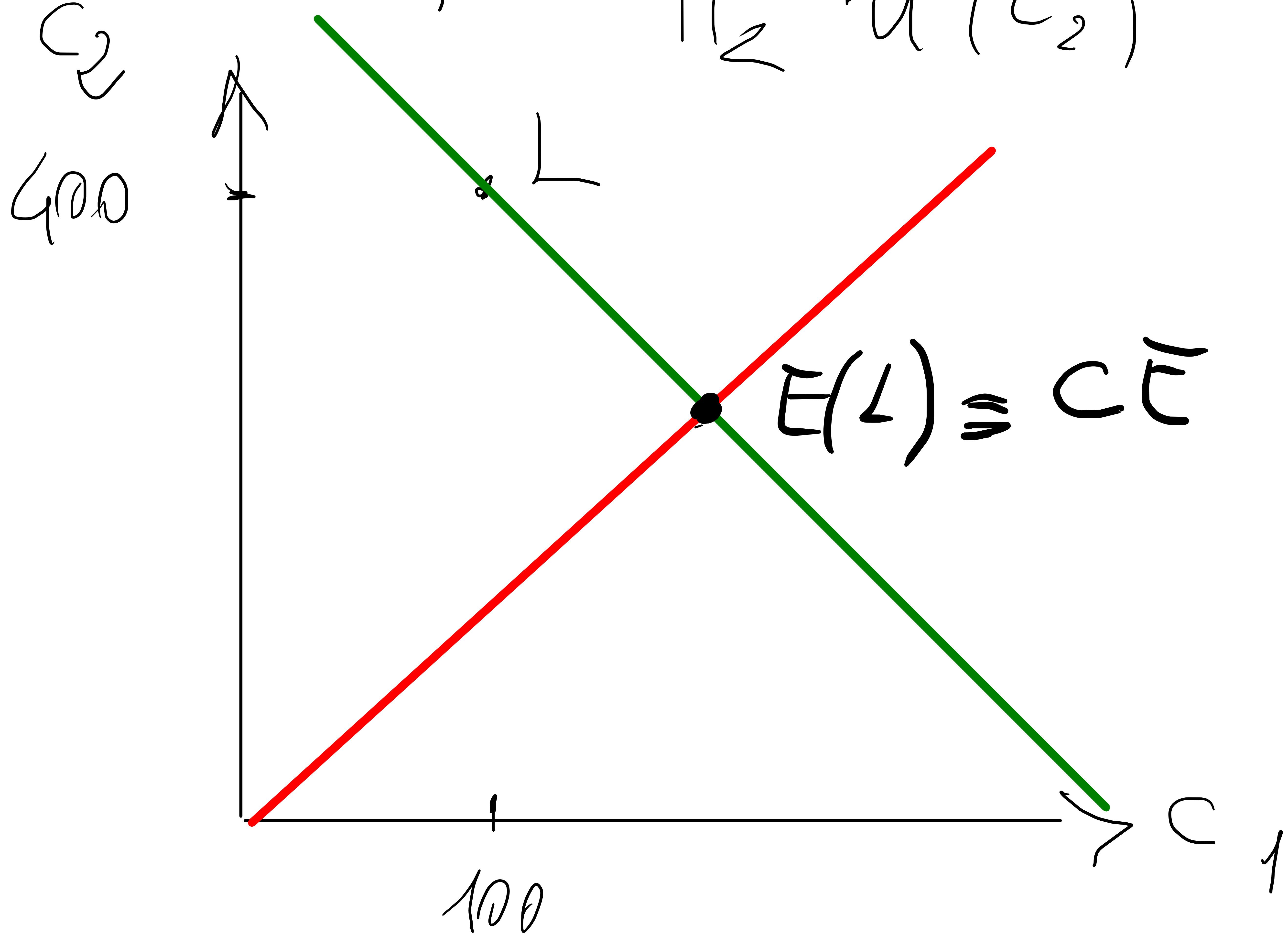
RISK PREMIUM = 25

$$EU(L) = \pi_1 \cdot C_1 + \pi_2 \cdot C_2 = 250$$

$$u(c) = c$$

$$u(c) = \alpha + \beta \cdot c$$

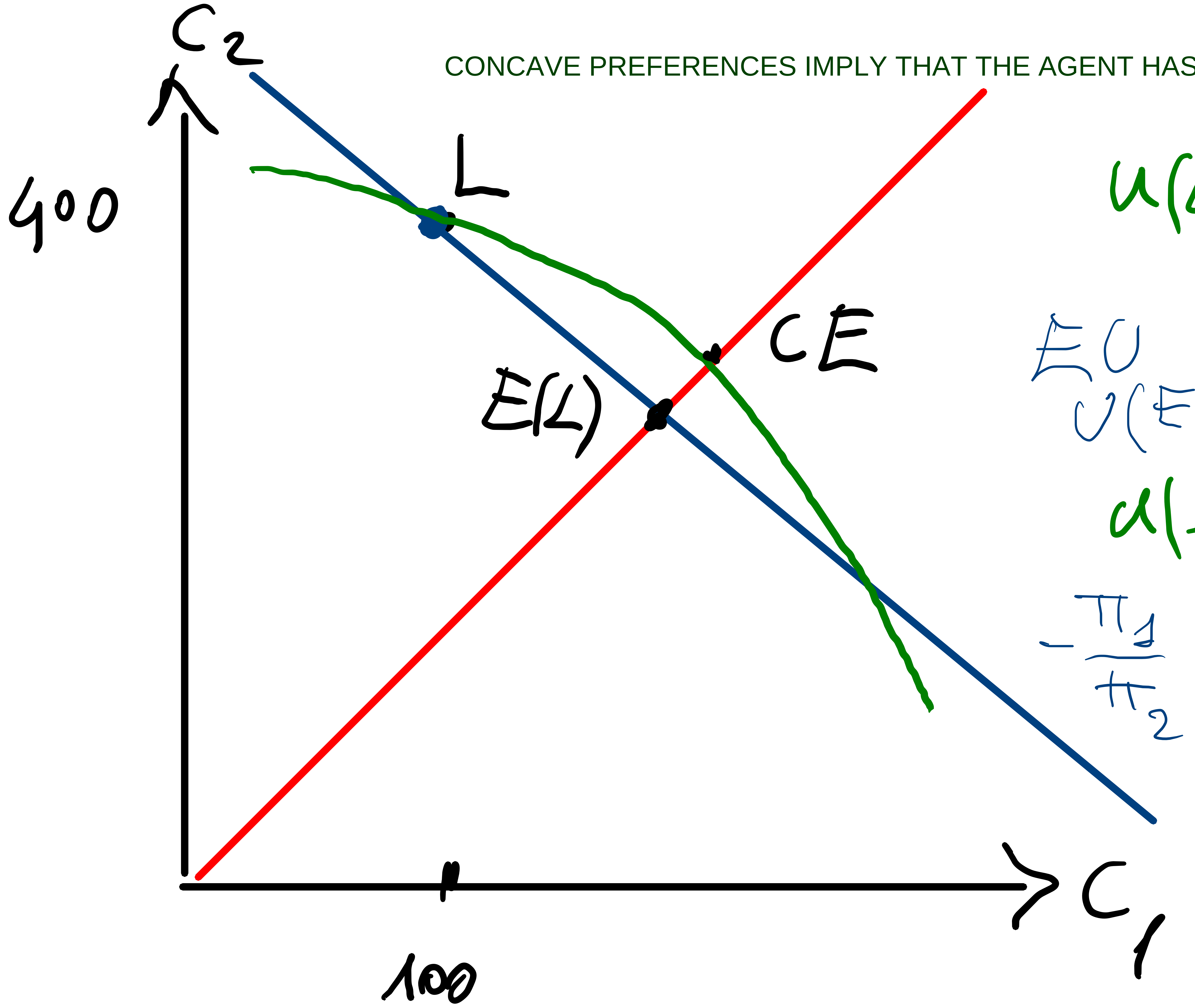
$$|MRS| = \frac{\pi_1 \cdot u'(c_1)}{\pi_2 \cdot u'(c_2)} = \frac{\pi_1}{\pi_2}$$

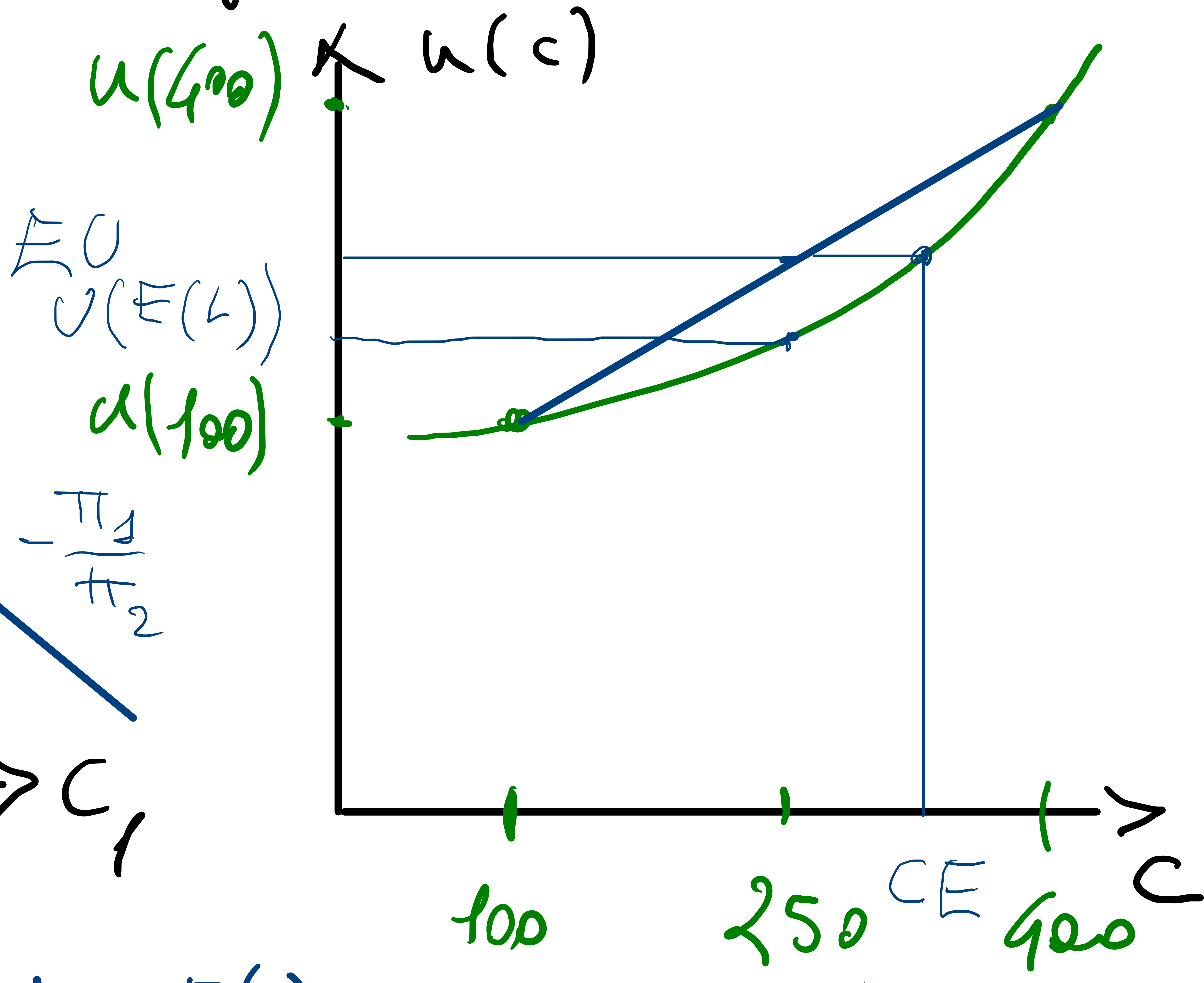


NOW CONSUMER IS RISK NUETRAL, SINCE HER UTILITY FUNCTION u(c) IS LINEAR

RISK PREMIUM IS ZERO

CONCAVE PREFERENCES IMPLY THAT THE AGENT HAS RISK LOVING BEHAVIOR





EU (L) > u(E(L))

RISK PREMIUM = E(L) - CE(L) < 0

E(L)

Von Neumann and Morgenstern (1944): Expected utility property:

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

any linear increasing transformation of EU preserves the expected utility property and represents the same preferences.

EU satisfies Independence property

Lottery A

Lottery B

if $A \succsim B$

Lottery C

$D = pA, (1-p)C$

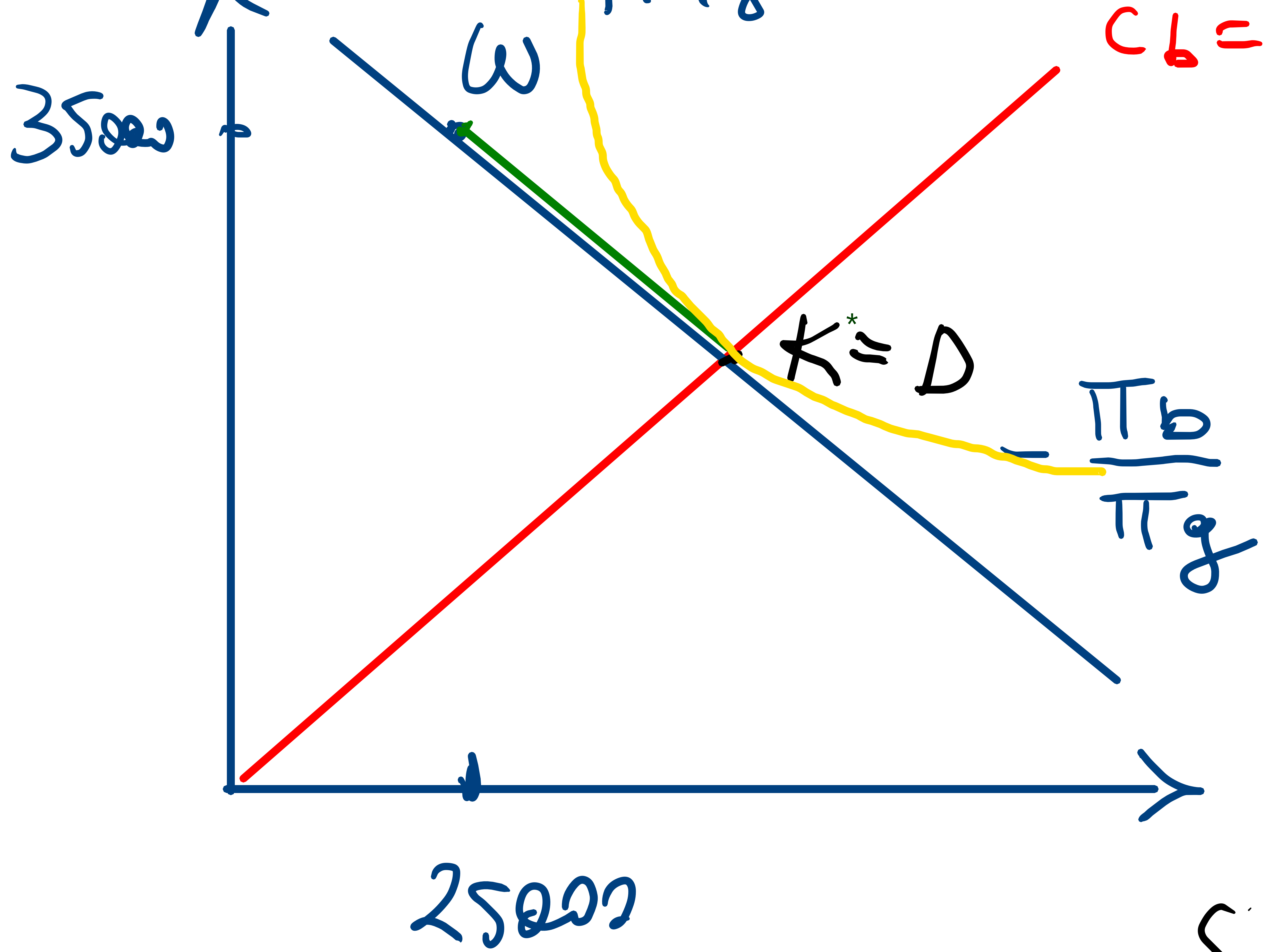
$E = pB, (1-p)C$

then $D \succsim E$

p = prob. of state 1

$1-p$ = " " " 2

Insurance



$u(c) = \log c$ RISK AVERSE AGENT

Budget line has Slope: $-\dfrac{\gamma}{1-\gamma}$

FAIR $\gamma = \pi_b$

$0 \leq K \leq D$

OPTIMUM INSURANCE HERE IS K* = D

$$\max_{c_b} \pi_b u(c_b) + \pi_g u(c_g)$$

$$\text{s.t.} \begin{cases} c_b = w_b + K - \gamma K \\ c_g = w_g - \gamma K \end{cases}$$

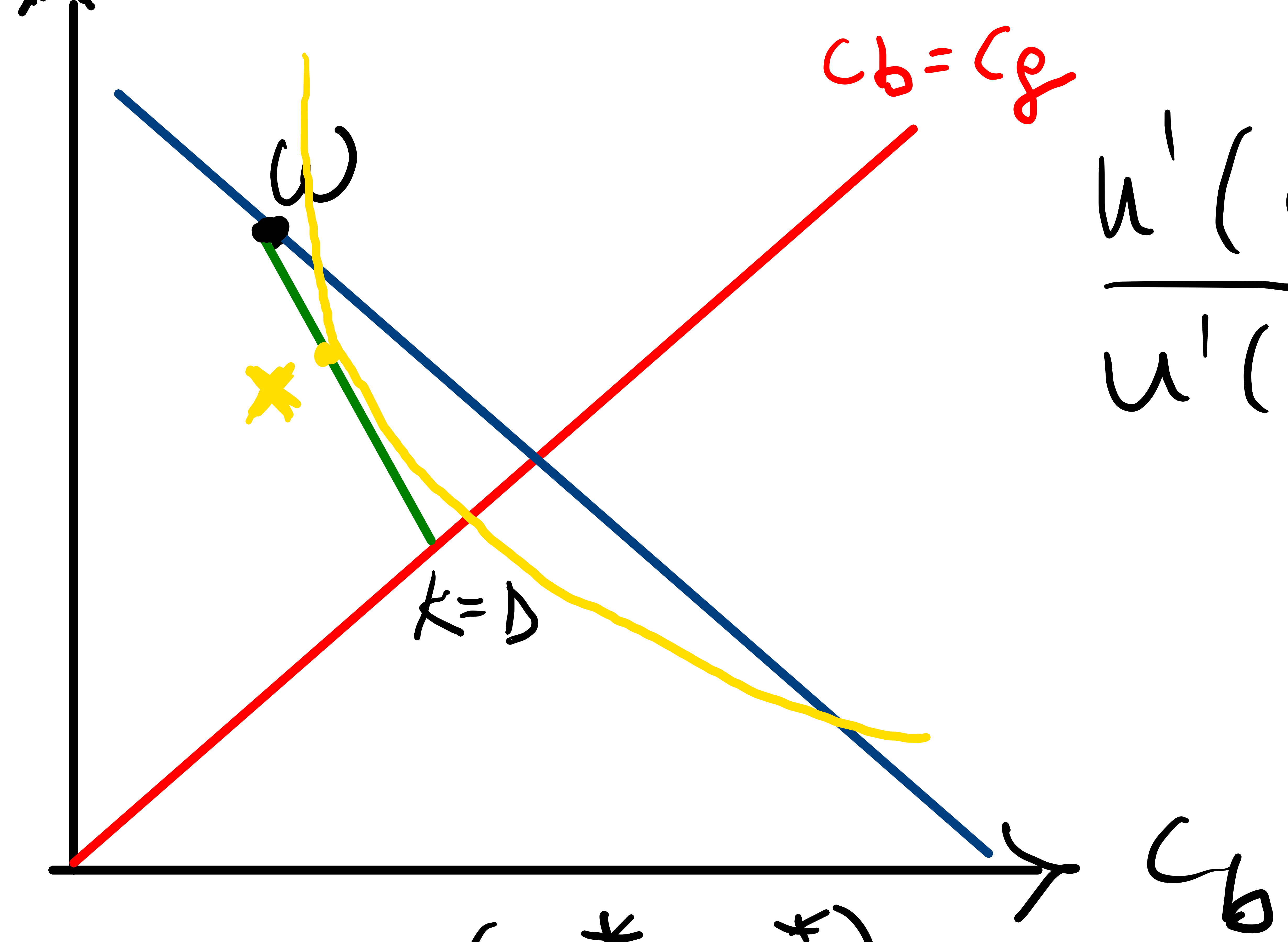
$$|MRS| = \frac{\gamma}{1-\gamma} = \frac{\pi_b}{\pi_g}$$

$D = 35000 - 25000 = 10000$

$$|MRS| = \cancel{\frac{\pi_b}{\pi_g}} \cdot \frac{u'(c_b)}{u'(c_g)} = \cancel{\frac{\gamma}{1-\gamma}}\ 1$$

AGENT IS RISK AVERSE, PREMIUM γ is not FAIR $\gamma > \pi_b$ $\quad u(c) = \log c$

1st order cond: $|MRS| = \frac{\pi_b}{\pi_g} \cdot \frac{u'(c_b)}{u'(c_g)} = \frac{\gamma}{1-\gamma}$



$X = (c_b^*, c_g^*)$

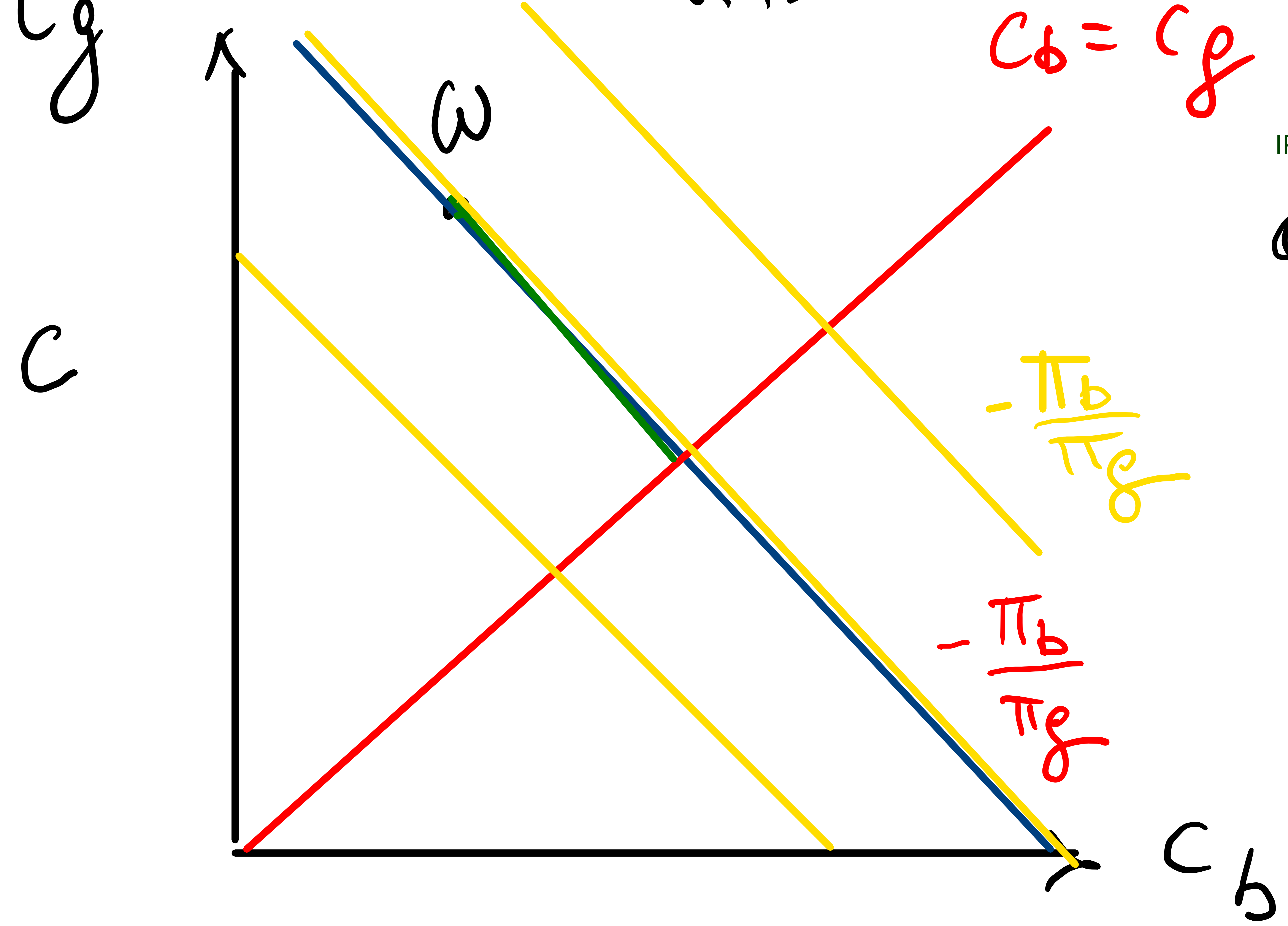
$$\frac{u'(c_b)}{u'(c_g)} > 1 \implies c_g > c_b$$

OPTIMUM INSURANCE IS $K^* < D$

if $\gamma > \pi_b$ and RISK AVERSION $\rightarrow 0 < K < D$
if γ is not too high

Risk neutral agent

$$U(c) = c$$



$\gamma = \pi_b$

IF PREMIUM IS FAIR

any k

$0 \le k \le D$

is indifferent

if $\gamma > \pi_b$

PREMIUM IS NOT FAIR AND THEN

$\to k^* = 0$