The Market for Insurance

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Trade in Contingent Markets

- The *risk* of a gamble is the difference between the payoff in the good state (C_G) and that in the bad state (C_B): Risk = C_G-C_B
- When we buy insurance we try to ***reduce*** risk by trading between two contingent states: “good” and “bad”
- We do this by buying wealth in the bad state and paying for it from wealth in the good state
- The rate at which we can make this exchange depends on the premium $\$\gamma$ (per \$ of insurance bought) charged by the insurance company
- $\$(1-\gamma)$ of additional C_B can be bought by giving up $\$\gamma$ of C_G
- So \$1 of additional C_B can be bought by giving up $(\gamma/1-\gamma)$ of C_G

More Specifically

- Suppose $\overline{C}_B$ and $\overline{C}_G$ are the "uninsured" payoffs. If \$Z is the amount of insurance at a price of γ then:
  - $C_G = \overline{C}_G - \gamma Z < \overline{C}_G$
  - $C_B = \overline{C}_B - \gamma Z + Z = \overline{C}_B + (1-\gamma)Z > \overline{C}_B$
- With full insurance, $C_G = C_B$ or:

$$\overline{C}_G - \gamma Z = \overline{C}_B + (1-\gamma)Z \Rightarrow Z = \overline{C}_G - \overline{C}_B$$

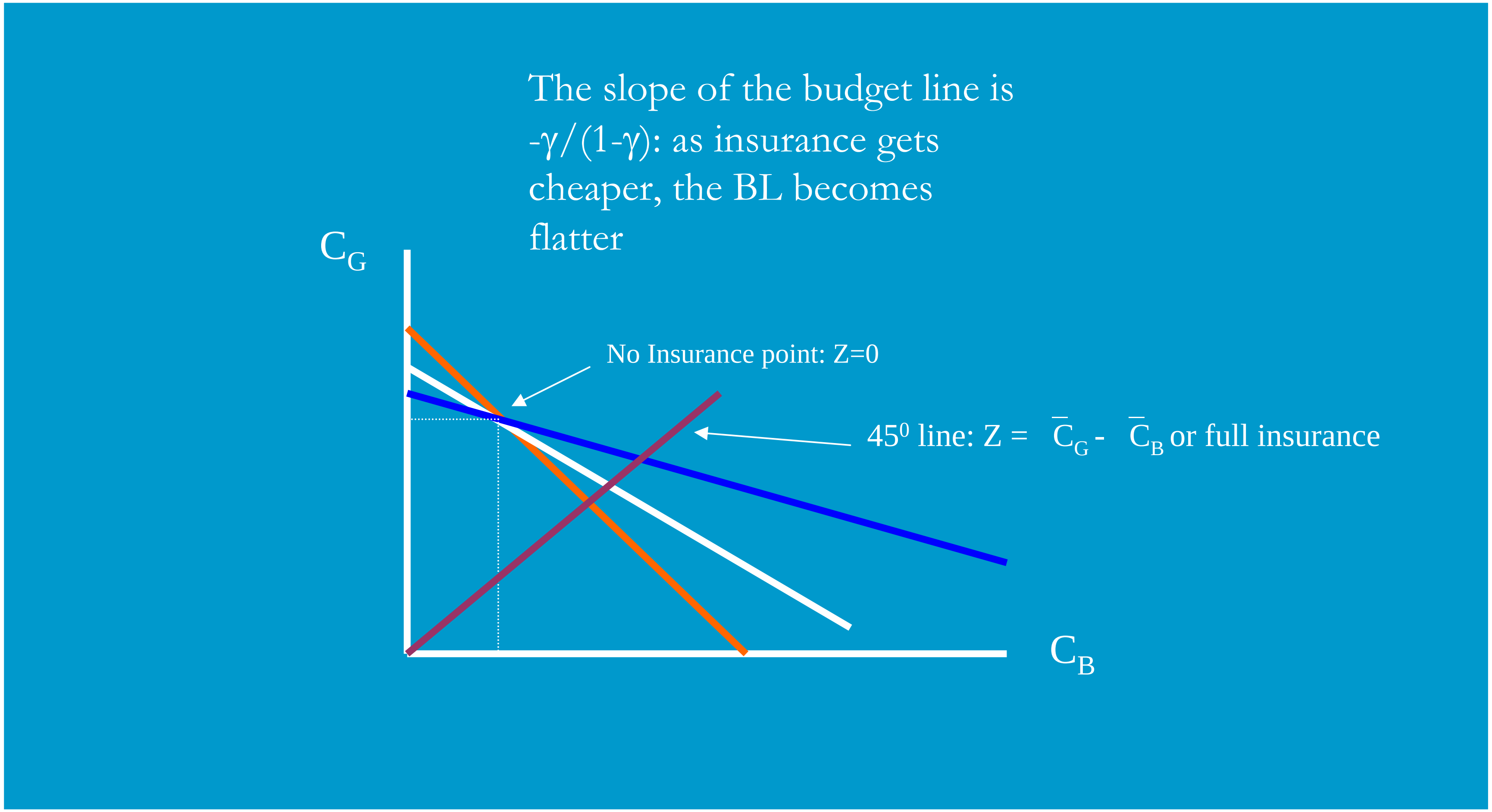
How Much Insurance to Buy?

- If $Z_F = \bar{C}_G - \bar{C}_B$ denotes full insurance, the consumer can buy Z between:

$$0 \leq Z \leq Z_F$$

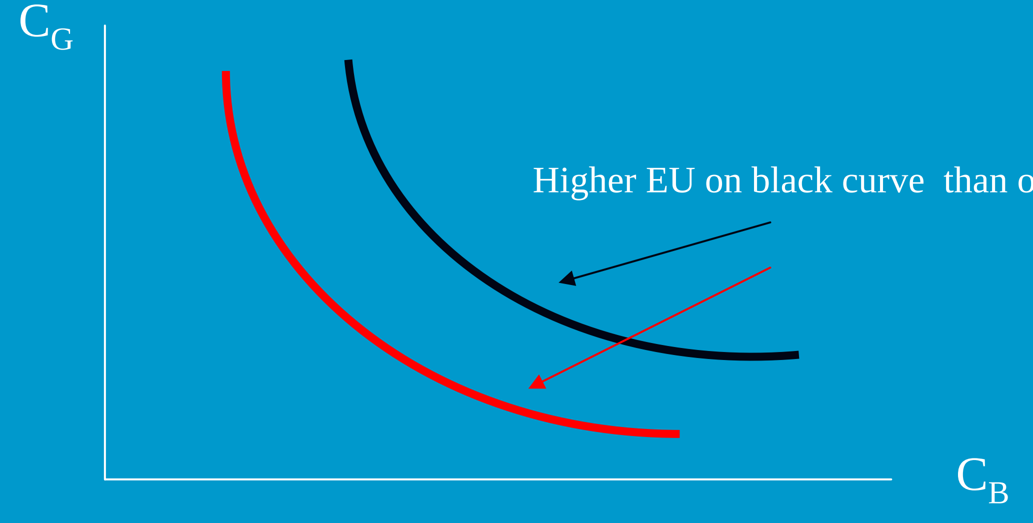
- How much insurance to buy? What should Z be?
- It depends on the price of insurance, γ

The Insurance Budget Line



The Contingent Consumption Indifference Curves

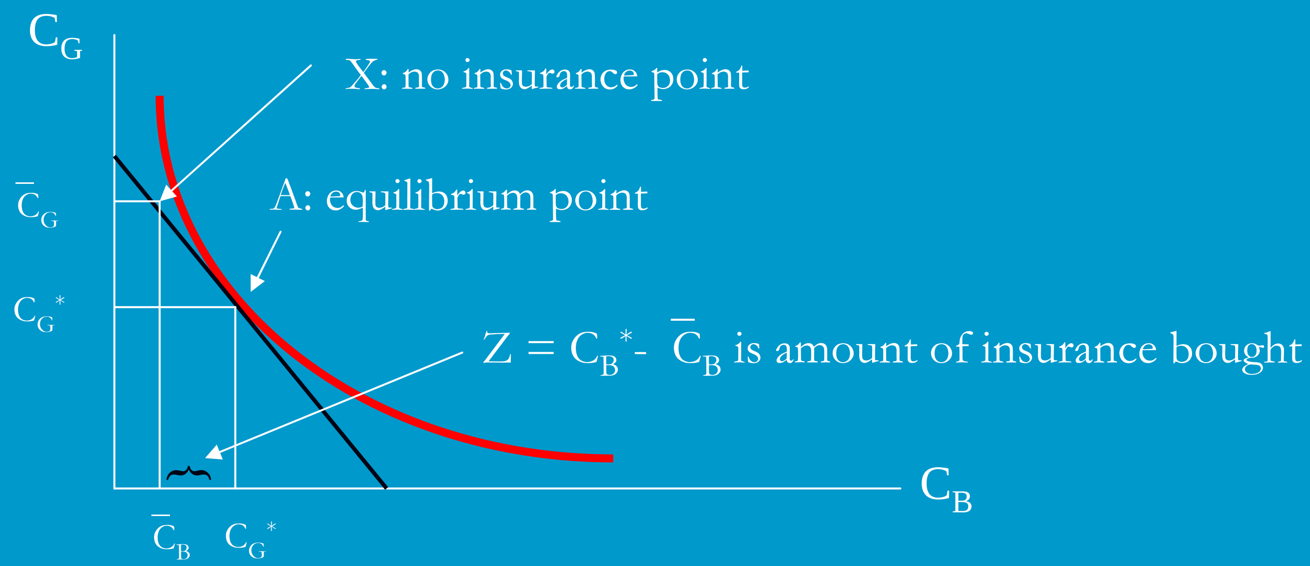
On each curve, different combinations of C_G and C_B give the same level of Expected Utility



Equilibrium in the Insurance Market

Equilibrium occurs when the budget line is tangential to the indifference curve

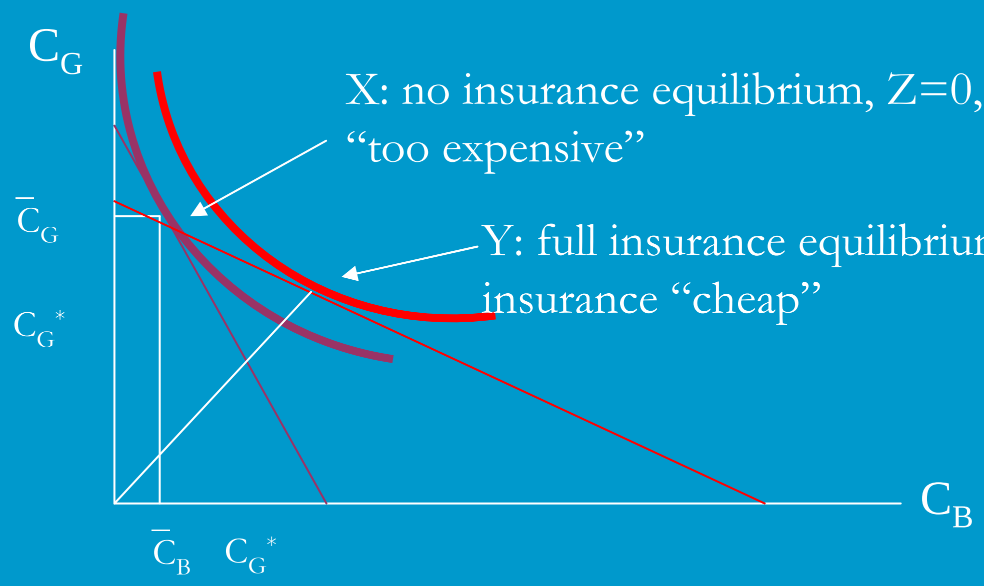
Given the terms offered by the insurance company, consumer maximises EU at point A



Different Types of Equilibrium in the Insurance Market

Equilibrium occurs when the budget line is tangential to the indifference curve

Given, the terms offered by the insurance company, consumer maximises EU at point X or at Y or at some point in between



Condition for Equilibrium

- Indifference Curve should be tangential to budget line
- This means that the slope of indifference curve equals slope of budget line
- Slope of indifference curve is marginal rate of substitution:
  - how much of wealth in the good state ***you are prepared to give up*** to get another $ of wealth in the bad state and still be on the same IC
- Slope of budget line is rate of exchange:
  - how much of wealth in the good state ***you have to give up*** to get another $ of wealth in the bad state

Interpreting Equilibrium

- MRS = γ/(1-γ)

$$\frac{p_B}{1-p_B} \times \frac{u'(C_B)}{u'(C_G)} = \frac{\gamma}{1-\gamma}$$

An Actuarially Fair Premium

- An ***actuarially fair*** premium is one which is equal to the probability of the adverse contingency

➢ $\gamma = p_B$

- When the premium is actuarially fair:

$u'(C_B) = u'(C_G)$

- So, under diminishing marginal utility: $C_B = C_G$
- Implying ***full insurance***

Under what market conditions will an actuarially fair premium be charged?

- The expected profit of an insurance company is:

$$\gamma Z - p_B Z \geq 0$$

- When the insurance industry is competitive, free entry of new firms will compete away excess profits:

$$\gamma Z - p_B Z = 0$$

- Which implies: $\gamma = p_B$