

1) Insurance Demand

<u>No Insurance</u>		<u>W/ Insurance</u>
$\pi \rightarrow Y_B = W - L = W - W = 0$ $1-\pi \rightarrow Y_G = W$	}	$\pi \rightarrow Y_B = W - L + (1-p)q = (1-p)q$ $1-\pi \rightarrow Y_G = W - pq$

a) Maximization Problem + FOC [10 Punkte]

$\max_q EU = (1-\pi) \cdot u(W-pq) + \pi \cdot u(W-L+(1-p)q)$ 3P

FOC: $\frac{\partial EU}{\partial q} = - (1-\pi)p \cdot \underbrace{u'(W-pq)}_{Y_G} + \pi(1-p) \cdot \underbrace{u'(W-L+(1-p)q)}_{Y_B} \stackrel{!}{=} 0$ 4P

Interpretation 1: Intuition

$$\pi(1-p) \cdot u'(W-L+(1-p)q) \stackrel{!}{=} (1-\pi) \cdot p \cdot u'(W-pq)$$

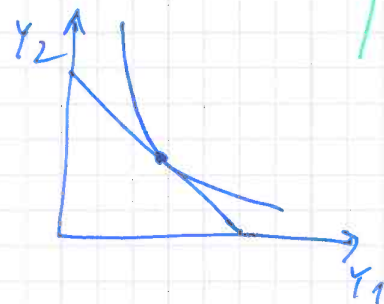
Expected Marginal Benefit of Insurance (if bad state of the world, insurance made sense ex-post)

Expected Marginal Cost of Insurance (if good state of the world, insurance did not make sense, ex-post)

Correct Interpretation 3P

Interpretation 2: Graphical

$$\underbrace{-\frac{p}{1-p}}_{\text{Slope of Budgetline}} = -\frac{\pi}{1-\pi} \cdot \frac{\overbrace{u'(W-L+(1-p)q)}^{Y_B}}{\underbrace{u'(W-pq)}_{Y_G}} \underbrace{\quad}_{\text{MRS}}$$



b) Comparative Statics: $\frac{\partial q^*}{\partial W}$ ∇ CARA [10 Punkte]

IFT: $\frac{\partial q^*}{\partial W} = - \frac{\frac{\partial FOC}{\partial W}}{\frac{\partial FOC}{\partial q^*}} \} < 0$ because $u''(\cdot) < 0$

1P

So $\frac{\partial FOC}{\partial W}$ is enough to determine the sign of $\frac{\partial q^*}{\partial W}$

$$\frac{\partial FOC}{\partial W} = - \underbrace{(1-\pi) \cdot p}_{\ominus} \cdot \underbrace{u''(W-pq^*)}_{\ominus} + \underbrace{\pi(1-p)}_{\oplus} \cdot \underbrace{u''(W-L+(1-p)q^*)}_{\ominus} \geq 0$$

\oplus \oplus \ominus

2P

Relate this to the individual's risk preferences

\hookrightarrow Substitute $(1-\pi)p$ from FOC: $(1-\pi)p = \pi(1-p) \frac{u'(Y_B)}{u'(Y_G)}$

$\Rightarrow \frac{\partial FOC}{\partial W} = -\pi(1-p) \cdot \frac{u'(Y_B)}{u'(Y_G)} \cdot u''(Y_G) + \pi(1-p) \cdot u''(Y_B) \iff$

$= \pi(1-p) \cdot u'(Y_B) \left[\frac{u''(Y_B)}{u'(Y_B)} - \frac{u''(Y_G)}{u'(Y_G)} \right]$

$= \pi(1-p) \cdot u'(Y_B) \left[\underbrace{-A(Y_B)}_{\oplus} - \underbrace{-A(Y_G)}_{\oplus} \right] = 0$ for CARA preferences

4P

\Rightarrow So $\frac{\partial q^*}{\partial W} = 0$ for Anna. As she gets richer she still wants to insure the same amount q^*

1P

- Unlikely to hold in real life, as most people have DARA preferences
 - It is however Not unrealistic that L and π stay constant as Y increases. The same applies (even stronger) for p ! So students should not argue along these lines.
- \hookrightarrow If anything, the $W=L$ argument can be made if done well

2P

c) Certainty equivalent & Risk premium [10 Punkte]

New Setup : $u(y) = \sqrt{y}$
 $w = 16$

(i) Expected utility w/o insurance

$EU = \frac{1}{2} \cdot \sqrt{16} + \frac{1}{2} \sqrt{0} = 2$

2P

(ii) Expected Income w/o insurance

$E(y) = \frac{1}{2} \cdot 16 + \frac{1}{2} \cdot 0 = 8$

2P

(iii) Certainty equivalent

$CE \neq u(CE) = EU = 2 \iff \sqrt{CE} = 2 \rightarrow CE = 2^2 = 4$

3P

(iv) Maximum Premium p_{max}

$p_{max} = E(y) - CE = 8 - 4 = 4$

3P

d) Trade of Risk [10 Punkte]

- (i) Private Risk : \bullet Anna has private risk, ①
 \bullet Boris does not have private risk ①
- Social Risk : There is social risk, which ①
Anna bears alone ①

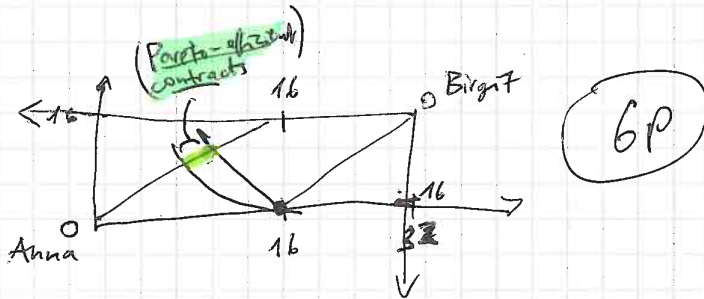
(ii) Edgeworth Box

6P

\Leftarrow Bottom End
(Overleaf)
 \rightarrow

	S1	S2	Σ
Anna	16	0	16
Birgit	16	16	32
Σ	32	16	

← Social Risk!



2. Insurance Supply

- a) Risk-spreading → Risk-averse shareholders (2P)
 - ↳ An adequate summary of the main arguments of slides 13-16 of Chapter 3 will earn full points. (5P)
- b) Risk-pooling → Risk of firm bankruptcy (2P)
 - ↳ An adequate summary of the main arguments of slide 5-12 of Chapter 3 will earn full points. (5P)
- c) Rand model → Insurance Cost (2P)
 - ↳ An adequate summary of the main arguments of slides 18-22 of Chapter 3 will earn full points. (4P)

3. Behavioral Insurance

- a) Why are behavioral problems especially pervasive in insurance markets?
 - ↳ See slide 3 of Chapter 5
 - ↳ Can be extended / substituted with contents from slides 4 & 5, as well (7P)
- b) What are nudges and how do they differ from traditional policy tools?
 - ↳ See slides 11-15 of Chapter 5 (possibly enhanced by slides 16-19 of Chapter 5) (8P)
- c) Nudge debate
 - Pro: slides 20+21 (possibly enhanced by slide 16-19 of Chapter 5) (8P)
 - Con: slide 24 of Chapter 5
- d) Example of them Pros & Cons
 - Either any of the examples of slides 25-26 OR (AND)
 - Any example students come up with and shows nudges (pros/cons) in action will do (7P)