Das Morgenstern-Paradoxon

		Holmes	
		Dover	Canterbury
Moriarty	Dover	100, – 100	0, 0
	Canterbury	– 50, 50	100, – 100

$$p_D = \text{Wahrscheinlichkeit, dass Moriarty nach Dover fährt}$$

$$p_C = 1 - p_D$$

$$q_D = \text{Wahrscheinlichkeit, dass Holmes nach Dover fährt}$$

$$q_C = 1 - q_D$$

$$\pi_M = p_D\left[(100)q_D + 0(1-q_D)\right] + (1-p_D)\left[(-50)q_D + 100(1-q_D)\right] =$$

$$= p_D(250q_D - 100) - 150q_D + 100$$

$$\frac{\partial \pi_M}{\partial q_D} = 250\,p_D - 150 \stackrel{!}{=} 0$$

$$p_D^* = \frac{150}{250} = 0,6$$

$$\pi_H = q_D\left[(-100)p_D + 50(1-p_D)\right] + (1-q_D)\left[(0)p_D + (-100)(1-p_D)\right] =$$

$$= q_D\left[(-250)p_D + 150\right] - 100 + 100p_D$$

$$\frac{\partial \pi_H}{\partial p_D} = -250q_D + 100 \overset{!}{=} 0$$

$$q_D^* = \frac{100}{250} = 0,4$$

Wahrscheinlichkeitsmatrix

		Holmes	
		Dover	Canterbury
Moriarty	Dover	$p_D^* \cdot q_D^* =$ $= 0,6 \cdot 0,4 = 0,24$	$p_D^*(1 - q_D^*) =$ $= 0,6 \cdot 0,6 = 0,36$
	Canterbury	$(1 - p_D^*)q_D^* =$ $= 0,4 \cdot 0,4 = 0,16$	$(1 - p_D^*)(1 - q_D^*) =$ $= 0,4 \cdot 0,6 = 0,24$

Zusammentreffen bedeutet Holmes' Tod:

$$\dagger_H = p_D^* \cdot q_D^* + (1 - p_D^*)(1 - q_D^*) = 0,24 + 0,24 = 48\ \%$$

Holmes ist mit 48 % tot, wenn er in London in den Zug steigt.

Alternativ:

$$\frac{\partial \pi_M}{\partial p_D} = \left[100 q_D + 0\right] - \left[-50 q_D - 100 q_D + 100\right] =$$

$$= 250 q_D - 100 \overset{!}{=} 0$$

$$q_D^* = 0,4$$

$$\frac{\partial \pi_H}{\partial q_D} = (-100\,p_D + 50 - 50\,p_D) - (-100 + 100\,p_D) =$$

$$= -250\,p_D + 150 \overset{!}{=} 0$$

$$p_D^* = 0,6$$