

(3)

$$\begin{aligned} (a) E_1 &= (1-p)(-4) + p \left[\frac{1}{2}(-10) + \frac{1}{2} \{ q \cdot 0 + (1-q)4 \} \right] \\ &= -4 + 4p + p[-5 + 2 - 2q] \\ &= -4 + p[1 - 2q] \end{aligned}$$

(b) Belief $\frac{1}{1+p}$ for (AK) & $\frac{p}{1+p}$ for (K,K)

$$\begin{aligned} (c) E_2 &= \frac{1}{1+p} [q(-10) + (1-q)(-4)] + \frac{p}{1+p} [q \cdot 0 + (1-q)(-4)] \\ &= \frac{1}{1+p} [-4 - 6q + p(-4 + 4q)] \\ &= \frac{1}{1+p} \{-4 - 4p + q(4p - 6)\} \end{aligned}$$

$$(d) \frac{\partial E_2}{\partial q} = \frac{4p-6}{1+p} < 0 \text{ for any } p \text{ so choose } q=0.$$

$$(e) \frac{\partial E_1}{\partial p} = 1 - 2q \Big|_{q=0} = 1 > 0. \text{ Therefore chooses } p=1.$$

$$\begin{aligned} (f) E_1 &= \frac{1}{2} E_1(K) + \frac{1}{2} E(A) \\ &= \frac{1}{2} [-4 + 1(1-0)] + \frac{1}{2} \left[\frac{1}{2} \cdot 0 + \frac{1}{2} \cdot 4 \right] \\ &= \frac{1}{2} [-4 + 1 + 2] = -\frac{1}{2} \end{aligned}$$

$$\begin{aligned} E_2 &= \frac{1}{2} E_2(K) + \frac{1}{2} E(A) \\ &= \frac{1}{4} [-4 - 4 + 0] + \frac{1}{4} [0 + 10] \\ &= \frac{1}{4} [-8 + 10] = \frac{1}{2} \end{aligned}$$