

$$(3) (a) \mu_2(C) = \frac{\frac{3}{2}p}{\frac{3}{2}p + \frac{1}{2}g} = \frac{3p}{2p+g} \quad \mu_2(D) = \frac{\frac{1}{2}g}{\frac{3}{2}p + \frac{1}{2}g} = \frac{g}{2p+g}$$

$$(b) E_2(\{C, D\}) = \frac{3p}{2p+g} [x \cdot 2 + (1-x) \cdot 0] + \frac{g}{2p+g} [x \cdot 0 + (1-x) \cdot 2] \\ = \frac{4px + 2g(1-x)}{2p+g}$$

$$\frac{\partial}{\partial x} E_2(\{C, D\}) = \frac{4p - 2g}{2p+g}$$

$$g < 2p \Rightarrow x=1$$

$$g = 2p \Rightarrow x \text{ arb}$$

$$g > 2p \Rightarrow x=0.$$

$$p=g=0 \Rightarrow x \text{ arb}$$

$$(c) E_1(A) = (1-p)2 + p[x \cdot 5 + (1-x)0] = 2(1-p) + 5px$$

$$\frac{\partial E_1(A)}{\partial p} = -2 + 5x$$

$$x < \frac{2}{5} \Rightarrow p=0$$

$$x = \frac{2}{5} \Rightarrow p \text{ arb}$$

$$x > \frac{2}{5} \Rightarrow p=1$$

$$(d) E_1(B) = (1-g)2 + g[x \cdot 0 + (1-x)5] = 2(1-g) + 5g(1-x)$$

$$\frac{\partial E_1(B)}{\partial g} = -2 + 5 - 5x = 3 - 5x.$$

$$x < \frac{3}{5} \Rightarrow g=1$$

$$x = \frac{3}{5} \Rightarrow g \text{ arb}$$

$$x > \frac{3}{5} \Rightarrow g=0.$$

$$(e) x < \frac{2}{5} \Rightarrow p=0 \& g=1 \Rightarrow x=0$$

$$x = \frac{2}{5} \Rightarrow p \text{ arb} \& g=1 \Rightarrow p = \frac{1}{2}, g=1$$

$$\frac{2}{5} < x < \frac{3}{5} \Rightarrow p=1 \& g=1 \Rightarrow x=1 \text{ Contradiction}$$

$$x = \frac{3}{5} \Rightarrow p=1 \& g \text{ arb} \Rightarrow x=1$$

$$x > \frac{3}{5} \Rightarrow p=1 \& g=0 \Rightarrow x=1$$

$$x=0, p=0, g=1$$

$$x=\frac{2}{5}, p=\frac{1}{2}, g=1$$

$$x=1, p=1, g=0$$