ECON 321, Professor Hogendorn

Problem Set 2 Answers

1. *Windy_a.*

   (a) The indifferent consumer gets equal utility from either restaurant, so

   $$v - p_a - x = v - p_b - R(1-x)$$
   $$-p_a + p_b + R = (1+R)x$$
   $$x = \frac{p_b - p_a + R}{1+R}$$

   (b) This is a simultaneous game. Restaurants a and b solve

   $$max_{p_a}\, \pi_a = p_a x \qquad max_{p_b}\, \pi_b = p_b(1-x)$$
   $$\text{FOC}: \tfrac{\partial \pi_a}{\partial p_a} = x - \tfrac{p_a}{1+R} = 0 \qquad \text{FOC}: \tfrac{\partial \pi_b}{\partial p_b} = (1-x) - \tfrac{p_b}{1+R} = 0$$
   $$p_b - p_a + R - p_a = 0 \qquad 1 - p_b + p_a - p_b = 0$$
   $$p_a(p_b) = \tfrac{p_b+R}{2} \qquad p_b(p_a) = \tfrac{1+p_a}{2}$$

   Solving the reaction functions simultaneously results in

   $$p_a = \frac{1+p_a}{4} + \frac{R}{2} \Rightarrow \frac{3}{4}p_a = \frac{1+2R}{4} \Rightarrow p_a^* = \frac{1+2R}{3}$$

   And then
   $$p_b^* = \frac{1}{2} + \frac{1+2R}{6} = \frac{2+R}{3}$$

   It's not surprising that p_a^* increases in R, but it is a little surprising that so does p_b^*. This indicates that even product differentiation that is negative from the point of view of restaurant b can still help it increase its price.