

Question for Precepts Week 9: November 23

A small town has just one pizza-maker who sells a large pie, and one beer store that sells sixpacks. Call pizza good 1 and beer good 2. It is known that when the prices of the two goods are P_1 and P_2 , the demands facing the two are

$$Q_1 = 36 - 2 P_1 - P_2, \quad Q_2 = 36 - P_1 - 2 P_2 .$$

The cost of making each pizza is \$2, and the cost of each six-pack is also \$2. Any fixed costs are sunk and can be ignored for the purpose of this question. The stores are price-setters and profit-maximizers.

(a) Are the goods substitutes or complements?

(b) Write down the algebraic formulas expressing the profits Π_1 and Π_2 of the two stores in terms of their prices P_1 and P_2 .

(c) Suppose the two choose their prices simultaneously and independently (Bertrand competition). Find the equations for the best response functions (reaction curves), and graph these showing P_1 on the horizontal axis and P_2 on the vertical axis. Find the Bertrand equilibrium, that is, the Nash equilibrium of the price-setting game. Find the prices, quantities, and profits of the two stores in this equilibrium.

(d) Now suppose the firms get together and choose P_1 and P_2 collusively to maximize the total profit $\Pi = \Pi_1 + \Pi_2$. To find this, you must maximize Π with respect to each price. To do so, obtain two equations for P_1 and P_2 by setting $\partial\Pi/\partial P_1 = 0$ and $\partial\Pi/\partial P_2 = 0$, and then solve the resulting pair of equations for P_1 and P_2 . Also draw the graphs of these two equations, either in the same graph as the one you drew for (c) above, or a separate one. Find the joint-profit-maximizing prices and quantities, and the resulting profit of each firm.

(e) Compare the prices, quantities, and profits in (c) and (d) above. You will find that the prices in (d) when firms are colluding are lower, not higher, than those in (c) where they are choosing prices independently. Give an economic intuition for this findings. What are the implications for antitrust policy?