LECTURE 5.3

PRICING COMPLEMENTARY PRODUCTS

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Consider what happens if firms can cooperate over complementary products?

Suppose Penelope owns a popcorn stand within Cindy's Cinema. Consumers purchase movies and popcorn together. The demand for movies and popcorn is given by

$$Q = 14 - (P_c + P_P),$$

P_c is the price of a movie, and P_p is the price of popcorn.

The marginal cost of popcorn is $2, and the marginal cost of an additional cinema patron is $0.

Cindy and Penelope choose their prices simultaneously. What are the equilibrium prices for Cindy and Penelope? We can see the maximum price of the two goods together must be $14.

PRICING COMPLEMENTARY PRODUCTS

First, consider Penelope's problem. Her profits are:

$$\pi_P = Q(P_P - c_P) = \big(14 - (P_C + P_P)\big)(P_P - 2)$$

To maximise profits, Penelope solves FOCs:

$$0 = 14 - P_C - P_P - (P_P - 2)$$

$$P_P = 8 - \frac{P_C}{2}$$

This is Penelope's reaction function, as a function of Cindy's price.

PRICING COMPLEMENTARY PRODUCTS

Next, consider Cindy's problem. Her profits are:

$$\pi_P = Q(P_C - c_C) = \big(14 - (P_C + P_P)\big)(P_C - 0)$$

To maximise profits, Cindy solves FOCs:

$$0 = 14 - P_C - P_P - (P_C - 0)$$

$$P_C = 7 - \frac{P_P}{2}$$

This is Cindy's reaction function, as a function of Penelope's price.

PRICING COMPLEMENTARY PRODUCTS

In equilibrium, both Cindy and Penelope are on their reaction functions:

$$P_P = 8 - \frac{7 - \frac{P_P}{2}}{2}$$

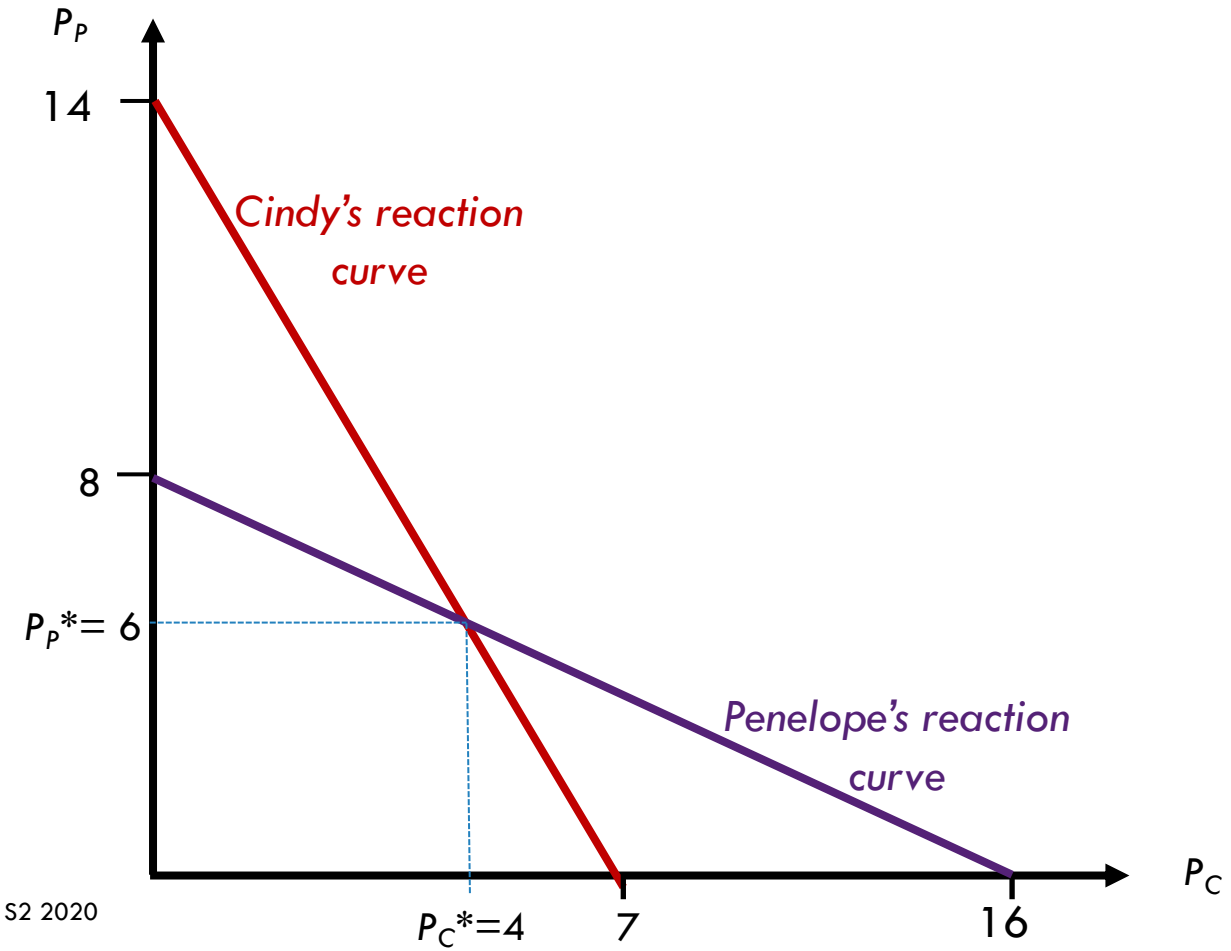
$$P_P = 6$$

Substituting into Cindy's reaction function:

$$P_C = 7 - \frac{P_P}{2} = 4$$

They sell 4 tickets/popcorns. They make $16 profit each.

PRICING COMPLEMENTARY PRODUCTS



A MULTIPRODUCT FIRM

An alternative is for Penelope and Cindy to cooperate over the pricing of complementary products

- create a joint venture
- merge
- cooperate (pricing agreements are illegal)

What is the optimal price of the combined product? Why is this different from the case of separate pricing?

A MULTIPRODUCT FIRM

Recall the demand curve and therefore the marginal revenue curve of the products.

Demand: $Q = 14 - P$

Marginal revenue: $MR = 14 - 2Q$

Now they will sell 6 tickets ($MR = MC = 2$) at a price of \$8 each for a total profit of \$36.