

APEC 3001 Discussion

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April 23, 2021

Today's Agenda

- 1 Housekeeping
- 2 Oligopoly Model Prices, Quantities, and Profits Example
- 3 Bertrand Oligopoly Model: Differentiated Products
- 4 Bertrand Differentiated Products Exercise
- 5 Questions

Housekeeping

- State your presence in the Zoom chat for a record of attendance
- Take a minute to download these slides from [Canvas under Week 13](#)
- [Problem Set 7](#) is due Thursday, April 29th @10PM CDT
- Follow link in TA bio on course Canvas page to sign up for [Wednesday office hours](#)
- For additional support, [Peer Tutors](#) are offered through the University library SMART Learning Commons

Oligopoly Model Prices, Quantities, and Profits Example

There are only two firms in this industry, firm A and firm B. The demand curve is $P = 14 - Q$. Both firms have the same marginal cost = average total cost = \$2. Determine the quantity each firm will produce and the market price for each of these models of imperfect competition.

	Collusive Monopoly	Cournot Oligopoly	Bertrand Oligopoly	Stackelberg Oligopoly (A is first mover)
A's Quantity				
B's Quantity				
Industry Quantity				
Price				
A's Profit				
B's Profit				

Bertrand Oligopoly Model: Differentiated Products

- Every model we have considered so far has shared a common assumption: that all firms in a particular market sell an identical product.
- Let us now consider a **differentiated product market**, which is a market with multiple varieties of a common product, in a Bertrand model.

Model Assumptions:

- Firms do not sell identical products. They sell differentiated products, meaning consumers do not view them as perfect substitutes.
- Each firm chooses the price at which it sells its product.
- Firms set prices simultaneously.

Bertrand Oligopoly Model: Differentiated Products

Suppose there are two snowboard manufacturers, Burton and K2, where the snowboards are substitutes but not *perfect* substitutes. The demand curve for Burton snowboards is $q_B = 900 - 2p_B + p_K$ and the demand curve for K2 snowboards is $q_K = 900 - 2p_K + p_B$. Both firms have a constant marginal cost, $MC = \$100$.

- To determine the equilibrium price for both firms, start with the profit-maximizing condition, $MR = MC$
- Burton's marginal revenue is $MR_B = 900 - 4p_B + p_K$ and K2's marginal revenue is $MR_K = 900 - 4p_K + p_B$
- Setting $MR_K = MC$ for Burton yields
$$900 - 4p_B + p_K = 100 \implies 4p_B = 800 + p_K \implies p_B = 200 + 0.25p_K$$
- Setting $MR_B = MC$ for K2 yields
$$900 - 4p_K + p_B = 100 \implies 4p_K = 800 + p_B \implies p_K = 200 + 0.25p_B$$

Bertrand Oligopoly Model: Differentiated Products

The demand curve for Burton snowboards is $q_B = 900 - 2p_B + p_K$ and the demand curve for K2 snowboards is $q_K = 900 - 2p_K + p_B$. Both firms have a constant marginal cost, $MC = \$100$.

- Substitute K2's price reaction function into Burton's price reaction function to determine the equilibrium price for Burton:

$$p_B = 200 + 0.25(200 + 0.25p_B)$$

$$p_B = 200 + 50 + 0.0625p_B$$

$$0.9375p_B = 250$$

$$p_B^* = \$266.67$$

- Substitute Burton's equilibrium price into K2's price reaction function to determine the equilibrium price for K2:

$$p_K = 200 + 0.25(266.67)$$

$$p_K^* = \$266.67$$

Bertrand Differentiated Products Exercise - Modified

Figure It out 11.4

We just determined the Nash equilibrium for Burton and K2, with each firm producing 633.33 snowboards (plug price back in to individual demand curves) at a price of \$266.67 per board. Now, suppose Burton launches an advertising campaign so that the demand for Burton snowboards rises to $q_B = 1000 - 1.5p_B + 1.5p_K$ and demand for K2 boards falls to $q_K = 800 - 2p_K + 0.5p_B$. Assume the marginal cost for each firm is still \$100.

- 1 Derive each firm's reaction curve.
- 2 What happens to each firm's optimal price?
- 3 What happens to each firm's optimal output?

Questions

Any remaining questions?

Additional Support Resources

- Boynton Mental Health Services
- Student Counseling Services
- Let's Talk
- Educational Workshops
- Academic Skills Coaching