**YORK UNIVERSITY Dr. F. Zandi**

**Schulich School of Business Winter 2019**

**ECONOMICS 3200**

**Assignment 2**

**Due April 1, 2019**

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1. **Porter Five- Forces**
2. **Game Theory**

Asahi and Kirin are the two largest sellers of beer in Japan. These two firms compete head-to head in the dry beer category in Japan. The following table shows the profit (in millions of yens) that each firm earns when it charges different prices its beer:

Kirin

¥630 ¥660 ¥690 ¥720

|  |  |  |  |
| --- | --- | --- | --- |
| 180, 180 | 184, 178 | 185, 175 | 186, 173 |
| 178, 184 | 183, 183 | 192, 182 | 194, 180 |
| 175, 185 | 182, 192 | 191, 191 | 198, 190 |
| 173, 186 | 180, 194 | 190, 198 | 196, 196 |

¥630

Asahi ¥660

¥690

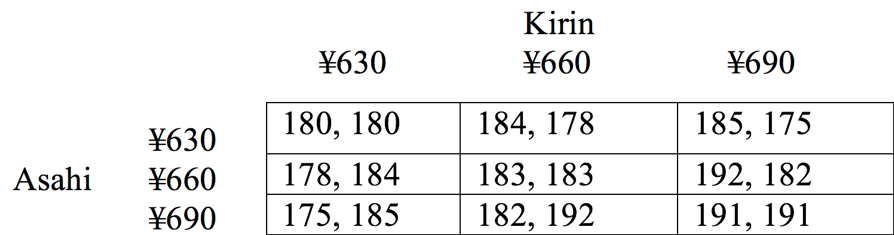
¥720

1. Does Asahi have a dominant strategy? Does Kirin?

Under the stated scenario neither player holds a dominant strategy.

1. Both Asahi and Kirin have dominated strategy: find them identify.

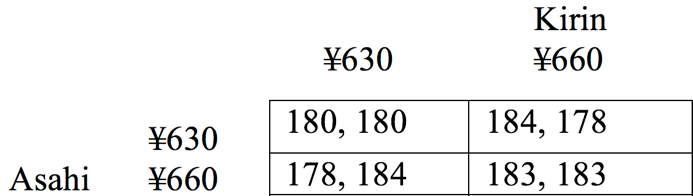
Asahi has a dominated strategy where ¥720 is dominated by ¥690. On the other hand, Kirin has a dominated strategy where ¥720 is dominated by ¥690.   
If we assume that neither player will go with these dominated strategies, we can eliminate them from the game. Thus, the reduced game will look like the following chart:



1. Let’s assume that Asahi and Kirin will not play the dominated strategy you identified in part (b). Having eliminated the dominated strategy, show that Asahi and Kirin now have another dominated strategy.

Kirin and Asahi will now have a dominant strategy from the reduced game, as the old dominant strategy has been removed. Hence, Kirin has a dominated strategy where ¥690 is dominated by ¥660 and Asahi has a dominated strategy where ¥690 is dominated by ¥660.

Once again, we assume that neither player will go with these dominated strategies we eliminate them from the game. Which leads to the following:



1. Let’s assume that Asahi and Kirin will not play the dominated strategy you identified in part (c). Having eliminated this dominated strategy, do Asahi and Kirin now have a dominant strategy?

Asashi and Kirim hold a dominant strategy of ¥630 as we have removed the last dominated strategy from the game.

1. What is the Nash equilibrium in the game?

The Nash Equilibrium will be at ¥630 for Asahi and ¥630 for Kirin

1. **Oligopoly market Structure**

Augie and Corinne are mineral spring duopolists facing a market demand given by the equation P = 24 - Q. Fixed costs are zero for both, but Augie has a constant marginal cost of $6 per unit, while Corinne's marginal cost is zero.

1. If they both behave as Cournot duopolists, give the equations for the two reaction curves, equilibrium levels of output, the market price, the profits of each, and the value of consumer surplus.

Ra: Revenue for Augie

Rc: Revenue for Corinne

Qa: Quantity Augie

Qc: Quantity Corinne

TCa: Total Cost Augie

TCc: Total Cost Corinne

Reaction Curves

Equilibrium Levels of Output

Market Price

Firm Profits

Consumer Surplus

1. Suppose instead that they both behave as non-cooperative Bertrand duopolists, and calculate the market price, the levels of output and profits of each, and the value of consumer surplus.

MCa = marginal cost of Augie

MCc = marginal cost of Corinne

Unlike in the case of Cournot equilibrium, competitors with the lower costs will raise prices until it meets the costs of the competitor, in order to maintain market share. Taking this into account, we can see that Corinne has the lower marginal costs; 0 < 6. Therefore, Corinne will raise her price until it matches the costs of Augie

We need to remember that this is being done in order to maintain existing market share, a derivation of the Cournot model. In the Cournot model;

1. If Corinne could effectively bribe Augie to shut down his production completely, regardless of the market price, so that she supplied the entire market, what is the maximum amount she would be willing to pay? What is the minimum amount he would accept?

The price Corrine would be willing to pay is the difference between the revenues earned from Cournot equilibrium and revenues earned from monopolistic production, if Corrine was to ignore the production capabilities of Augie.

Therefore, Corrine is willing to pay $100-$144=$44 for Augie to suspend operations.

Augie will charge Corrine expect a minimum payment of what she earns from Cournot equilibrium; i.e. Ra = $16

1. **Transfer Pricing**

The IXL Company, which manufactures tomato sauce, has recently acquired Robinson Farms, Inc. its tomato supplier. As a result of this takeover, IXL will be organized into two main divisions, the agricultural division and the manufacturing division. Now, instead of IXL buying the tomatoes from Robinson at a negotiated price, the manufacturing divi­sion will buy tomatoes from the agricultural division at a transfer price that will be chosen to maximize the firm's overall profits.

The firm's demand function for tomato sauce has been estimated to be Q = 15.0376 -0.75185P, where Q represents thousands of cases and Pis the price per case. The total variable cost schedules for the agricultural division and the manufacturing divi­sions are estimated to be

TVCA = 3QA + 0.5QA2 (MCA = 3 + QA) and TVCM = QM + 0.25QM2 (MCM = 1 + 0.5 QM) respectively. Note that a case of tomatoes (40 kgs) holds exactly enough tomatoes to make a case of tomato sauce (24 cans).

1. Supposing there to be no external market for tomatoes within a reasonable distance, calculate (i) the optimal transfer price, (ii) the optimal output, and (iii) the optimal price level.

MCf = Marginal cost of the firm

1. Transfer Price = Pt(3.846 units) = $6.85 per thousand cases of tomatoes
2. Optimal Output: MCf = MRf, Q = 3.846 units (thousands)
3. Optimal Price Level: Pf(3.846 units) = $14.88 per thousand case of cans
4. Now supposing that there is a nearby market for fresh tomatoes, and that the competi­tive price for tomatoes is $6 per case, what is (i) the optimal transfer price, (ii) the amount transferred, (iii) the amount bought and sold in the market, and (iv) the mat output and price for IXL's tomato sauce.
5. Optimal Transfer Price = Competitive Price = $6

The amounts transferred are 3 thousand cases of tomatoes



The total amount of cases used is 4.114 thousand cases of tomatoes and 1.114 thousand cases of tomatoes are bought from marker



The firm will charge $7.66 per case of tomato sauce and will make revenues of $9.688, assuming that there are no fixed costs.

1. Now suppose, instead, that there is an imperfectly competitive market for the agricultural division's tomatoes, since people in the local town think Robinson's fresh sun-ripened tomatoes are different from other tomatoes. The external demand curve for tomatoes is estimated to be P = 16 - 0.75Q. What is the (i) optimal transfer Price (ii) the price to the external market, (iii) the total amount of tomatoes produced and split of this between the internal and external markets, and (iv) the profit-maximizing price of IXL's tomato sauce?

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