

Newspaper Wars

The senior management of Daily News wants a short report that addresses the following questions with respect to the pricing of newspapers:

- a) Suppose that each firm's newspapers price is set only once and must be either \$0.25 or \$0.50. What price should the Daily News charge?

Simultaneous Game:

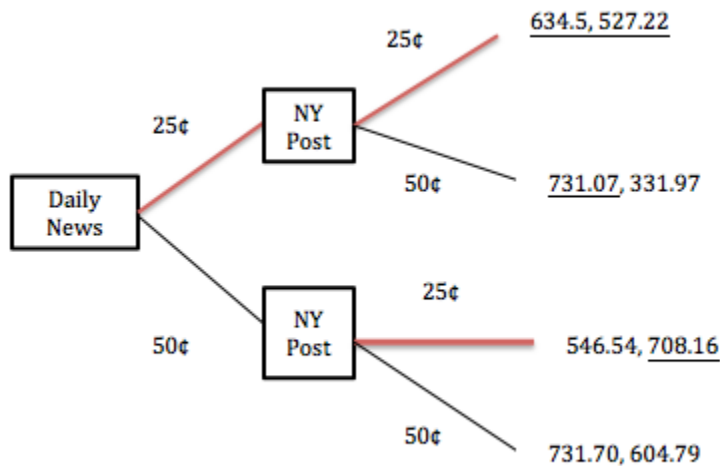
Average Weekly Gross Profit		New York Post	
		\$0.25	\$0.50
Daily News	\$0.25	<u>\$634.50, \$527.22</u>	\$731.07, \$331.97
	\$0.50	\$546.54, <u>\$708.16</u>	<u>\$731.70, \$604.79</u>

- If both companies set their price once and simultaneously, then the Daily News will set its price at \$0.25 because the New York Post has a dominant strategy at \$0.25 pricing.

Sequential Game:

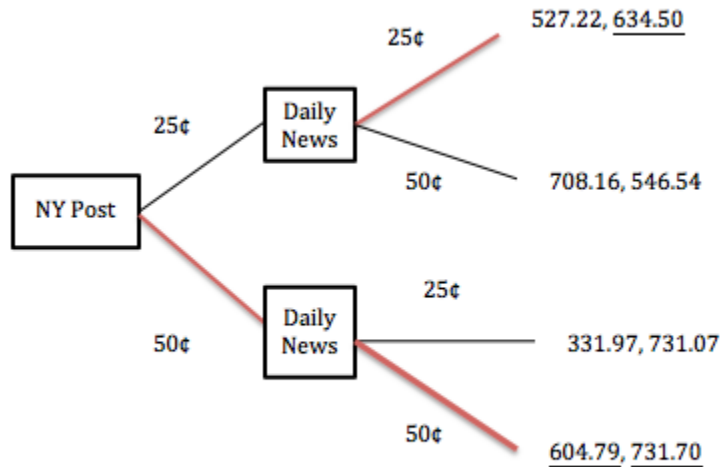
- A. If Daily News gets to set its price first, using backtracking method, we realise that it is profitable for Daily News if it sets its price to \$0.25 as it would be more profitable as New York Post will always set their price at \$0.25 since it is the most profitable for them.

Sequential when Daily News begins 1st



B. Now, If New York Post was able to set the price first, using the backtracking method, we realise that it is profitable for New York post to set its price to \$0.50 because New York and Daily News Post both generate higher gross profit when both set their price to \$0.50.

Sequential when NY Post begins 1st



- b) Suppose that prices are set only once but each newspaper complete flexibility as to what price to charge (What price should the Daily News charge?

Daily News

Demand

$$Q_n = 1183.234402 - 1602.60833P_n + 841.5898011P_p$$

$$\text{Ad Revenue} = 101.1215 + 0.493928Q_n$$

$$\text{Circulation Revenue} = 1183.234401P_n - 1602.60833P_n^2 + 841.5898011P_pP_n$$

$$\text{Total Revenue} = 685.5541017 + 391.6612748P_n - 1602.60833P_n^2 + 415.6847673P_p + 841.5898011P_pP_n$$

$$\text{Fixed Cost} = 525$$

$$\text{Marginal Cost} = 0.13Q_n$$

$$\text{Depreciation} = 0.08Q_n$$

$$\text{Total Cost} = 525 + 0.21Q_n$$

$$\text{Total Cost} = 773.4792244 - 336.5477493P_n + 176.7338582P_p$$

$$\pi = -87.9251227 + 728.2090241P_n - 1602.60833P_n^2 + 238.9509091P_p + 841.5898011P_nP_p$$

$$\pi' = 728.2090241 - 3205.21666P_n + 841.5898011P_p$$

$$P_n = \frac{728.2090241 + 841.5898011P_p}{3205.21666}$$

New York Post

Demand

$$Q_p = 751.7613 + 1189.122P_n - 1591.62P_p$$

$$Ad\ Revenue = 114.9802 + 0.582826Q_p$$

$$Circulation\ Revenue = 751.7913P_p - 1591.62P_p^2 + 1189.122P_pP_n$$

$$Total\ Revenue = 553.1262314 + 693.0512188P_n - 175.8462181P_p - 1591.62P_p^2 + 1189.122P_pP_n$$

$$Fixed\ Cost = 525$$

$$Marginal\ Cost = 0.12Q_p$$

$$Depreciation = 0.08Q_p$$

$$Total\ Cost = 525 + 0.20Q_p$$

$$Total\ Cost = 675.35226 - 237.8244P_n - 318.324P_p$$

$$\pi = -122.2260286 + 930.8756188P_n + 142.4777819P_p - 1591.62P_p^2 + 1189.122P_pP_n$$

$$\pi' = 142.4777819 - 3183.24P_p + 1189.122P_n$$

$$P_p = \frac{142.4777819 + 1189.122P_n}{3183.24}$$

Solve for P_n :

$$P_n = \frac{728.2090241 + 841.5898011\left(\frac{142.4777819 + 1189.122P_n}{3183.24}\right)}{3205.21666}$$

$$P_n = 0.264932648$$

Price (cents)		Gross Revenue (000)	
D News	NY Post	D News	NY Post
\$ 0.25	\$ 0.25	\$ 667.37	\$ 540.06
\$ 0.26	\$ 0.25	\$ 661.90	\$ 550.79
\$ 0.27	\$ 0.25	\$ 656.47	\$ 561.52
\$ 0.28	\$ 0.25	\$ 650.76	\$ 572.25
\$ 0.29	\$ 0.25	\$ 645.08	\$ 582.96
\$ 0.30	\$ 0.25	\$ 639.13	\$ 593.65
\$ 0.31	\$ 0.25	\$ 633.20	\$ 604.21
\$ 0.32	\$ 0.25	\$ 627.00	\$ 614.96
\$ 0.33	\$ 0.25	\$ 620.82	\$ 625.45
\$ 0.34	\$ 0.25	\$ 614.38	\$ 636.01
\$ 0.35	\$ 0.25	\$ 607.95	\$ 646.27
\$ 0.36	\$ 0.25	\$ 601.27	\$ 656.73
\$ 0.37	\$ 0.25	\$ 594.59	\$ 667.00
\$ 0.38	\$ 0.25	\$ 587.92	\$ 677.20
\$ 0.39	\$ 0.25	\$ 581.48	\$ 687.33
\$ 0.40	\$ 0.25	\$ 575.14	\$ 697.38
\$ 0.41	\$ 0.25	\$ 568.99	\$ 707.35
\$ 0.42	\$ 0.25	\$ 562.90	\$ 717.08
\$ 0.43	\$ 0.25	\$ 556.97	\$ 726.72
\$ 0.44	\$ 0.25	\$ 551.29	\$ 736.39
\$ 0.45	\$ 0.25	\$ 545.59	\$ 745.81
\$ 0.46	\$ 0.25	\$ 539.99	\$ 755.11
\$ 0.47	\$ 0.25	\$ 534.45	\$ 764.29
\$ 0.48	\$ 0.25	\$ 528.95	\$ 773.34
\$ 0.49	\$ 0.25	\$ 523.47	\$ 782.26
\$ 0.50	\$ 0.25	\$ 518.08	\$ 791.04

Since round numbers - especially \$0.25 and \$0.50 - are clearly “focal points” for tabloid pricing, lets return to the choice of just two price points. And for the purposes of simplification, let's assume that both newspapers have symmetric payoffs and assign the hypothetical values as given by the matrix below.

Payoffs		New York Post	
		\$0.50	\$0.25
Daily News	\$0.50	\$270, \$270	\$70, <u>\$300</u>
	\$0.25	<u>\$300</u> , \$70	<u>\$190</u> , <u>\$190</u>

- c) *Provide a week-by-week “dynamic” strategy for pricing that the Daily News’ management can continue to implement after your consulting engagement has ended. In essence, you must give them instructions for what price (\$0.50, or \$0.25) to set at the beginning of every week (starting with week 1), based on whatever information you believe is relevant from the history (experience) of prices and pricing in previous periods at each weekly decision point. You should use a 52-week time horizon. You should also justify your strategy.*

In consideration of a long-term pricing strategy for Daily News, we want to weaken the price competition by incentivizing New York Post to set its price at \$0.50 instead of \$0.25. Pricing strategy at \$0.25 does not maximize profit for Daily News or New York Post. Despite the dominant strategy and nash equilibrium is to charge \$0.25, Daily News and NY Post will both be better off by charging \$0.50, earning \$270,000 in weekly payoff instead of \$190,000. In order to claim this pricing cooperation from New York Post, Daily News should set the price at \$0.50 whenever New York Post charges \$0.50 by introducing a cooperative action to charge a higher price.

Historically, New York Post charged \$0.50 from weeks 1-11 and raised prices from \$0.25 to \$0.50 from weeks 27-31. Should this pricing pattern repeat in the future, Daily News should also raise its price to \$0.50 and signal a pricing cooperation. However, if New York Post undercuts its price to \$0.25, Daily News should retaliate by matching its price at \$0.25. This commitment is likely to work because of Daily News’ credible reputation to match competitor’s price in the past. When New York Post cut prices in week 12, Daily News immediately followed with their own price cut in week 14. The message is clear that if New York Post were to cut prices in the future, Daily News will reciprocate. Therefore, the intuition behind this dynamic strategy for pricing that Daily News’ management should implement is to incentivize New York Post to keep prices high and enforce cooperation by penalizing New York Post with a reciprocating price cut whenever they deviate from this commitment.

Notes:

- Series of price cuts and retaliatory moves by NYP
 - Daily News forced to compete, suffering losses
 - Murdoch known to clash prices and take losses
- Current Price War Situation
 - Previous Price: \$0.50
 - Current Price: \$0.25
 - Advertising and circulation increased
 - Net profit declined more
- Revenue Structure
 - Sales
 - Advertising
 - Varies with circulation (volume)
- Cost Structure
 - Overhead: \$525,000/wk
 - Depreciation of equipment: \$0.08/copy
 - Varies inversely with circulation (volume)
 - NYP
 - Marginal Cost: \$0.12/copy
 - Daily News
 - Marginal Cost: \$0.13/copy

Notes from Juan:

Hello to all. In question (b) of the project there is a lot more that you can do than just solve for the Bertrand equilibrium (with different costs).

For example, using the data in the file, and regression analysis you can find

1) the quantity demanded for each paper, as a function of both papers' prices.

2) advertising revenue (for each paper) as a function of its quantity sold.

Then, one can write each paper's profit as sales revenue, plus advertising revenue minus cost (write that as a function only of both firms' prices), and find each firm's best response, and then the equilibrium, as we did in class in the example of the NYT, and the WSJ.

