

Second Quiz: Solutions
Managerial Economics: Eco 685

Question 1

One advantage is theft prevention since the cash register must be used to make change, creating a paper trail. A disadvantage is that queues become longer (or more cashiers are needed) which explains why arenas do not use 99 cent pricing.

Question 2

The firm should increase prices. Demand will fall only a little, thus revenues will rise. Further, since less is being produced costs fall as well.

Question 3

- a. This is third degree discrimination against the business traveler.
- b. The goods are different so no discrimination exists.
- c. This is a quantity discount, or second degree discrimination.
- d. Third degree discrimination against those with little time to send in rebates.
- e. The dry cleaning industry claims women's clothes take longer to dry clean, and hence no discrimination. Critics claim instead that this is third degree discrimination against women.
- f. Each student receives a different aid package, hence we have first degree discrimination.

Longer Questions

Question 4

- a. The cost of goods sold is simply the \$40 piece of hardware. Thus:

$$P = 1.725 \cdot \$40 = \$69 \tag{1}$$

Therefore, the quantity sold is:

$$Q = 25 - \frac{1}{3}\$69 \rightarrow Q = 2 \tag{2}$$

The profits are thus:

$$\pi = PQ - TC = 69 \cdot 2 - 30 - 40 \cdot 2 - \frac{1}{2} \cdot 4 = \$26 \tag{3}$$

b. We are maximizing profits:

$$\pi = PQ - TC = Q(75 - 3Q) - \left(30 + 40Q + \frac{1}{2}Q^2\right) = 75Q - 3Q^2 - 30 - 40Q - \frac{1}{2}Q^2 \quad (4)$$

Setting the derivative equal to zero gives:

$$75 - 6Q - 40 - Q = 0 \rightarrow Q = 5 \quad (5)$$

Thus:

$$P = 75 - 3 \cdot 5 = 60 \quad (6)$$

$$e_p = \frac{P \partial Q}{Q \partial P} = \frac{60}{5} \cdot \frac{-1}{3} = -4 \quad (7)$$

$$\pi = 60 \cdot 5 - 30 - 40 \cdot 5 - \frac{1}{2}5^2 = 57.5 \quad (8)$$

- c. The extra profits are $57.5 - 26 = 31.5$. The optimal pricing strategy takes into account the labor costs and how competitive the market is, while cost plus pricing does not. Suppose we raise the price from the optimum of \$60 to the cost plus price of \$69. This small increase in price reduces demand by more than 50% (from 5 to 2). Profits fall by more than 50%, since the fall in sales more than offsets the increase in price. This market is very competitive ($e = -4$), so the result is not too surprising. Cost plus pricing fails to take into account the competitive nature of the market. Although it is less of a factor, cost plus pricing also fails to take into account the labor costs.

Question 5

- a. If Boeing holds, Airbus should cut since $16 > 8$. If Boeing cuts, Airbus should cut, since $18 > 10$. Thus the dominant strategy for Airbus is to cut, since Airbus cuts regardless of what Boeing does. If Airbus holds, Boeing should hold since $12 > -6$. If Airbus cuts, Boeing should hold because $26 > 24$. Thus Boeing should hold regardless of what Airbus does. Thus holding for Boeing is a dominant strategy.
- b. Since there are two dominant strategies, Airbus cuts and Boeing holds is a (the only) Nash Equilibrium.
- c. No, Airbus knows it is in Boeing's best interest to keep prices high rather than lower prices. Such a move would allow Boeing to compete better against Airbus, but would also lose revenues from loyal customers.

Question 6

a. We have for beer:

$$e_I = \frac{\text{percent change in } Q}{\text{percent change in } I} = \frac{\frac{40-50}{50}}{\frac{\$9,000-\$10,000}{\$10,000}} = \frac{-.2}{-.1} = 2 \quad (9)$$

For vodka:

$$e_I = \frac{\frac{525-500}{500}}{-.1} = \frac{.05}{-.1} = -\frac{1}{2} \quad (10)$$

- b. Beer has an income elasticity above 1 and is thus a luxury good. Vodka has an income elasticity less than 0 indicating that vodka is an inferior good.
- c. In most countries vodka would be a normal good and a luxury (and much lower consumption per capita!!), so here we illustrate how demand and optimal pricing can vary across countries. In Russia, we would predict a 1% increase in income would cause a 2% (sensitive) increase in demand for beer, but a one-half percent decline in demand for vodka (less sensitive).