Econ 235
Asymmetric information and Elasticity
Homework Number 3


Exercise 0:

The following equation relates the total revenue variation of a food seller to other relevant variables:

\[ \Delta R = \left[ R_h \left( 1 + \varepsilon_{Q_h, P_h} \right) + R_c \varepsilon_{Q_c, P_h} \right] \% \Delta P_h \]

where \( R_h \) is the revenue due to the sale of hot dogs, \( R_c \) is the revenue from cola, \( \% ( P_h \) is the price variation in percent.

Use this relationship to give an advice to the restaurant manager. He is (only) selling hot dogs and cola. He earns $150 every day from every hot dogs he sells and $100 every day from cola. He has observed that almost all his customers buy hot dogs and Cola at the same time.

Working with data from the store, the marketing researcher told him that:

The own price elasticity of hot dogs is:

\[ \varepsilon_{Q_h, P_h} = -0.5 \]

And the cross-price elasticity of cola is:

\[ \varepsilon_{Q_c, P_h} = -3.0 \]

Is the observation of the seller consistent with the findings of the marketing researcher?

Explain with sentences why or why not?
Initial price of hot dogs is $5. What would be the effect if he increases their price up to $5.5?
Show the detail of your calculation.
Hint: to solve for these exercises, it is crucial to put yourself in the shoes of each parties. You must analyze how each person considers the deal given the information he or she has.

Exercise 1: Asymmetric Information. Larry Hagman is a corn farmer in Central Iowa. He is in the middle of corn harvest on a Friday afternoon and has a machinery breakdown; he needs a new part for his combine to be able to continue with harvest.

A) Larry knows that if he does not get this part today he will not be able to work again until Monday. He also knows that 10% of the parts that he buys from the only supply store in his small hometown are defective. If Larry gets a defective part he will not be able to return it until Monday and risks loss of his crop due to the weather. Therefore, he is willing to pay $100 for a part that will get him back in the field and the value of a defective part is $0. If the price of the part at the supply store, is $92 will Larry buy the part? (Show work and Explain)

B) Larry also needs a second part for his combine. He knows that 25% of these parts are defective; however, the supply store offers a full money back guarantee on this part. The value to Larry is $200 if the part fixes his breakdown and $0 if the part is defective. The price of the part is $175 at the supply store will Larry purchase the part? (Show work and Explain)

Exercise 2.
Larry Hagman JR. owns a cattle ranch in Alaska. In his ranch he has two different businesses. He raises cattle and sells timber. He has fences around his property and also fences dividing his pastures. He is planning to sell timber to a local sawmill. There are around 100 sawmills buying timber in that area. The owners of the sawmill know that sometimes the ranchers sell timber that has nails in it. (The lazy hired hands have not always used post to make fences. Instead of that they have nailed the barbed wire to growing trees 30 years ago.) If there is a nail in timber the sawmill will have a major breakdown.

Larry’s hired hands have been cutting the timber for couple of months already. The buyer of sawmills comes up to buy timber from Larry. The buyer does not have any possibilities to find out if the timber that Larry is selling has any nails or not. The buyer is ready to pay $10 per unit for timber with nails and $100 per unit for those without nails. (If there is one nail in the timber bundle it is considered to be timber with nails.)

a) What kind of problem afflicts the transaction between Larry and the buyer?

b) The buyer’s experience is that the probability of timber bundles with nails is 0.25. Larry knows that this special bundle of timber does not have any nails. Larry has decided that he is not going sell this bundle if he does not get at least $90 per unit of his timber. Can the buyer and Larry strike a deal? Show your calculation and explain.

c) Larry wishes to sell another bundle of timber. The buyer’s experience is that the probability of timber bundles with nails is 0.25. Larry knows that this special bundle of
timber does not have any nails. The company is always able to indicate the seller of timber. This time Larry decides to offer a money back guarantee to the buyer. He still needs $90 for his timber. If there is a nail in timber the sawmill is allowed to keep the timber and in this case the value of timber to Larry is zero. Can the buyer and Larry strike a deal? Show your calculation and explain.

d) Larry wishes to sell a third bundle of timber. Buyer’s experience is that the probability of timber bundles with nails is 0.25. Larry knows that this special bundle of timber does have nails. There is a small chance (20 percent) that the sawmill mixes the timber with timber from other ranchers. This is the probability that the sawmill company is unable to establish Larry’s responsibility for the major break down. If Larry sells timber as nail-free and sawmill is able to find out that Larry sold this special bundle, the sawmill is allowed to keep the timber and in this case the value of timber to Larry is zero. Show your calculation and explain.

Should Larry offer a money back guarantee to the buyer and charge $90 per unit of timber (nail-free) or should he sell it for $10 per unit of timber (with nails)?

Is the sawmill going to buy Larry’s timber bundle under these circumstances as timber without nails?

The sawmill company can invest into a tracking technology that reduce to 7% the probability that it is unable to establish Larry’s responsibility (or any other buyer). Does it invest if the cost of this technology is $2/bundle? (Explain carefully)