Problem Set 10 – Answer Guide

1. Explain the nature and consequences of asymmetric information for each of the following cases. What options are available in each instance to reduce the problem?

a. medical insurance
b. issuance of credit cards
c. professional athletes
d. market for used appliances

2. Firms that produce low quality TVs have a marginal cost of production equal to £ 100. Firms that produce high quality TVs have a marginal cost of production equal to £ 200. Consumers value low quality TVs at £ 110 and high quality TVs at £ 210. What will the prices be if there is full information? If 25% of TVs are low quality, but consumers don't know which is which, what will happen in this market? What could we do to prevent this?

3. People cannot tell the difference between high quality heroin and low quality heroin. I value high quality heroin at £ 20 and low quality heroin at £ 5. The drug dealer values high quality heroin at £ 15 and low quality heroin at £ 4. At what critical percentage of low quality heroin do we get only low quality heroin in the market? That is, what percentage of low quality heroin do we need for there to be adverse selection?

4. It is a common saying that new cars lose 10% of their value the second you drive them off a lot. Defend this statement using the concept of asymmetric information.

5. While self-employed workers have the option to purchase private health insurance, many - especially younger - do not due to adverse selection. Suppose that half the population is healthy and the other half is unhealthy. The cost of getting sick is $1,000 for healthy people and $10,000 for unhealthy people. In a given year, any one person gets sick with probability .4. Each person's utility of wealth function is $U(W) = W^{0.5}$. Initial wealth for everybody is $30,000. Although each person knows whether she is healthy, the insurance company does not (so they must charge the same price to everybody). The insurance company offers complete, actuarially fair insurance

a. If everybody purchases insurance, what is the price of the insurance?
b. At the price you determined, do healthy people purchase insurance?
c. If only unhealthy people purchase insurance, what is the price?
d. At the price you determined in c, do unhealthy people purchase insurance?
e. Given that each person has the option to purchase insurance? What is the price of the insurance?

6. Prestige University grants degrees only to high skill students who perform well for their eventual employers. Mediocre University grants degrees only to low skill students. The market demand for newly graduated high skilled workers is: $Q_H^D = 5{,}000 - \frac{1}{20}P_H$. The market demand for newly graduated low skilled workers is: $Q_L^D = 15{,}000 - \frac{1}{3}P_L$. Currently, Prestige University graduates 1,000 students while Mediocre University graduates 5,000. Determine the equilibrium prices for low and high skilled graduates. Suppose that in an effort to cut costs, the State has merged Prestige University and Mediocre University into State University. This merger has eliminated the signal that employers use to rely on to discern graduate quality. As a result, the demand for State University graduates is: $Q^D = 10{,}000 - 23/120\ P$. The number of graduates from State University will be 6,000. Calculate the equilibrium price for State University graduates. Before the merger, would students at both Universities be willing to pay higher tuition in an effort to prevent the Universities from merging? Why or why not?

7. Education is a continuous variable, where e_h is the years of schooling of a high-ability worker and e_l is years of schooling of a low ability worker. The education for these types of workers is c_h and c_l, respectively, where $c_l > c_h$. The wages they receive if employers can tell them apart are w_h and w_l. Under what conditions is a separating equilibrium possible? How much education will each type of worker get?

8. The market for used cars in a particular region includes both high quality and low quality cars. High quality cars are sold primarily to quality sensitive customers, while low quality cars are sold to price sensitive buyers. The submarkets for high quality and low quality cars can be described by the supply and demand curves:

$$Q_D^H = 160{,}000 - 12.5P^H$$
$$Q_S^H = -48{,}000 + 13.5P^H$$
$$Q_D^L = 110{,}000 - 12.5P^L$$
$$Q_S^L = 20{,}000 + 10P^L,$$

where Q_D^H, Q_S^H refer to the quantities demanded and supplied of high quality cars, Q_D^L, Q_S^L refer to the quantities demanded and supplied of low quality cars, PH and PL refer to the prices of high quality and low quality cars. All quantities are measured in cars per month, prices are measured in dollars.

a) Assuming that buyers and sellers are both able to distinguish low quality and high quality cars, determine the price and quantity that will prevail in each submarket.
b) Examine the case where sellers are able to accurately determine used car quality but buyers are not. You may assume that buyers assume that all cars are of average quality so that an average demand curve is appropriate. Determine the price and quantity in each submarket.
c) Using diagrams, analyze the additional developments in the market until final long run equilibrium is reached. You must describe the eventual outcome, but no calculations are required for this part of the problem.

9. Suppose the wage of a high quality person is £ 10 and the wage of a low quality person is £ 5. Low quality people cannot get education and the cost of education for a high type is £ 3. θ is the percentage of people who are high quality. For what values of θ is separation a unique equilibrium? For what values of θ do we have multiple equilibria?

10. We have 40 high quality people and 20 low quality people. The wage for a high quality person is £ 500 and the wage for a low quality person is £ 100. The cost of going to school is £ 200 (and bad people cant attend). People are given a vote whether or not to ban education. What is the outcome?

Suppose the government lowers the cost of education to £ 100. What will happen in the labor market? What will be the result of the vote now?