Economics 385: Suggested Solutions to Midterm 1

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1. There is one competitive equilibrium. If the low types trade, the price is 5, so this is an equilibrium. If the low and medium types trade, the price is

$$p = \frac{5/2 + 10/4}{1/2 + 1/4} = 6\frac{2}{3}$$

so this is not an equilibrium. Finally, if all three types trade, $p = 8\frac{3}{4}$, so this is not an equilibrium.

2. The equilibrium is given by

$$p = E\left[\theta \,\Big|\, \frac{3}{4}(\theta - 1) \le p\right]$$
$$= \frac{1 + \frac{4}{3}p + 1}{2}$$

This yields: $p = 3$. The distribution of reserve values is $r \sim U[0, 7.5]$. Hence the probability of trade is

$$\text{Prob}(r \le p) = \frac{p - \underline{r}}{\overline{r} - \underline{r}} = \frac{3}{7.5} = \frac{2}{5}$$

By plotting the function $E[\theta|r(\theta) \le p]$, one can tell that there are no other equilibria.

3. There are two pure strategy equilibria. First, low types trade and the price is $p = 10$. Second, both types trade, and the price is $p = 13$.

There is also a mixed strategy equilibrium. The price is $p = 12$, so the high types are indifferent between putting their cars on the market and keeping them off. Let x be the probability of the high types sell their cars. We know that

$$\frac{10 + 16x}{1 + x} = 12$$

This means that $x = 1/2$. Hence the low types always sell their cars, while the high types put their cars on the market with probability $1/2$.