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

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

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

2. The equilibrium is given by

\[
p = E\left[\theta \mid \frac{3}{4}(\theta - 1) \leq p\right] = 1 + \frac{\frac{3}{4}p + 1}{2}
\]

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

\[
\text{Prob}(r \leq p) = \frac{p - r}{p - \frac{3}{4}} = \frac{3}{7.5} = \frac{2}{5}
\]

By plotting the function \( E[\theta|r(\theta) \leq p] \), 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.