Assignment 3

Due in tutorials in the week of March 16^{th}.

Problem 18 from Ch. 10 of the required textbook. *(3 marks)*

Question 1. *(4 marks)* Compare the impact of rent control when the supply of housing is fixed and when supply curve is upward sloping. For full marks

- Draw two diagrams representing the two situations, on each diagram indicate competitive equilibrium (denote P^* and Q^*),
- Show price and quantity that is **actually** rented out under rent control (denote $\overline{P}$ and $\overline{Q}$). Compare and comment on what happens to quantity of housing rented in each case.
- Conduct welfare analysis: show any gains and losses in consumer and producer surplus in each case, comment which changes in the surpluses are a welfare transfer and which are a welfare loss.
- Why is welfare loss different in these situations?

Question 2. *(3 marks)* Consider 2 cases (i) supply curve is perfectly elastic and demand curve is downward sloping. (ii) demand curve is perfectly inelastic and supply curve is upward sloping. Compare the impact of a 1 dollar per unit tax levied on producers.

- Draw two diagrams representing the two situations. Show competitive equilibrium (Q^* and P^*). Show after tax equilibrium (P_t and Q_t) on your diagrams.
- These are extreme cases in which the entire tax burden is placed on one side of the market. Who pays the entire tax in in each case?
- Compare the dead weight loss in these two cases: in which case is the dead weight loss larger? Why?

Problem 1. *(10 marks)*
Consider a competitive market with demand given by $P = 450 - .5Q$ and supply given by $P = Q$.

a) Find competitive equilibrium price and quantity P^* and Q^*. What are the consumer and producer surplus?

b) Suppose government introduces as per unit tax of $t = 30$ on producers. Find the quantity traded in the market after tax Q_t. Find the price paid by consumers P_t and price received by producers after tax P_S.

c) Calculate consumer and producer surplus, tax paid by consumers, tax paid by producers, and the total tax revenue to the government, find the dead weight loss associated with the tax.

d) Calculate price elasticity of demand and supply in the competitive market equilibrium using point elasticity formula. Now calculate what percentage of tax revenue is paid by the consumers and what percentage is paid by the producers. What can you say about the relationship between the elasticity of supply and demand and the shares of tax paid by consumers and producers?

e) Show your results on a diagram. In particular indicate competitive equilibrium, after tax quantity and prices, after tax consumer and producer surplus, government revenue and the dead weight loss.

CHECKING YOUR CALCULATIONS After you obtain Q_t you can check whether it is correct: plug it into the demand and the supply equations, the prices that you get should be different by tax which is 30: $P_S = P_t - 30$. After tax CS + PS + GR + DWL should be equal to the CS+PS before tax (Because you are looking at the same area between the demand and supply curve up to their intersection).