**NTU SSS Economics HE2001**  
**Tutorial 8 (Simple Welfare Analysis)**

1) Let us consider the case of a per unit subsidy.   
Assuming that we have linear supply curves and demand curves. Illustrate using a diagram:

1. The effects of a per unit subsidy of on *producers*.
2. The effects of a per unit subsidy of on *consumers*.

For a) and b), indicate in the diagram(s) consumer surplus, producer surplus and amount of deadweight welfare loss.

1. How do you think the elasticity of supply and demand will affect the incidence of benefits of a per unit subsidy on producers?

2) In the market for cars, the market demand curve is given by while market supply curve is given by

1. Suppose that there is an ad-valorem (percentage) sales tax of 5 percent paid by consumers. I.e. where is the price paid by buyers and is the price received by sellers. Solve for the equilibrium and and quantity in the market.
2. Illustrate the effects of the ad-valorem tax above in a diagram, indicating the consumer surplus, producer surplus and deadweight welfare loss.

3) In the bubble tea market, there are 2 consumers with different preferences and 10 homogeneous firms. Consumer 1 has inverse demand function while Consumer 2 has inverse demand function . Each of the firms has inverse supply function .

1. Derive the (aggregate) market supply curve and market demand curve.
2. What is the equilibrium quantity and price in the market? Calculate the amount of producer and consumer surplus in the market.
3. Suppose there is a per-unit tax on firms of $0.5. What is the deadweight welfare loss from the tax?

4) In this question, let us try out some comparative statics methods as in the lecture.   
  
Let the supply of bubble tea be and the demand for bubble tea be .

Here, we want to investigate the effects of demand elasticity on economic outcomes.   
Recall that to have a proper comparison of how elasticity affects outcomes, we need to fix the initial no-tax equilibrium price and quantities (even if changes); this involves changing depending on values of .

1. To keep the no-tax equilibrium price and quantities constant at $5, and 2500 units respectively, show that
2. Suppose there is now an excise tax of dollars. Write out the equilibrium prices faced by consumers and producers, and the equilibrium quantity in terms of elasticity .
3. Using part (b), for a positive tax , how does the elasticity of demand affect the equilibrium quantity?
4. Using the above parts, show that the deadweight welfare loss increases with the elasticity of demand for a fixed tax .

**Sample Questions (No solutions will be provided)**

1) In Quasitown, there are 1000 consumers with identical utility function: , where is the number of cups of bubble tea consumed, and is the consumer’s holding of money. Suppose each consumer has an income of 15 and that the price of bubble tea is .

On the supply side, there are 100 perfectly competitive firms (price takers) with identical production cost functions: , where is the number of bubble tea produced.

1. Derive i) the individual and market demand functions, and ii) the firm’s supply function, as well as the market supply function for bubble tea. **(12 marks)**
2. What is the competitive equilibrium price and quantities of bubble tea (consumed by each consumer and produced by each firm)? **(7 marks)**

A politician in Quasitown hates bubble tea, and decides to implement a consumption tax of 0.3 dollars per cup of bubble tea.

1. Show that the price of bubble tea for consumers (including the tax), increases to 5.05.

**(8 marks)**

1. Discuss whether the consumption tax imposed is socially efficient. **(8 marks)**

2) Consider the market for wallets. The *market* supply curve is given by There are consumers with *individual* demand curves given by

1. Derive the market demand curve in terms of . **(5 marks)**
2. Suppose there is a per-unit tax of $50 on the producers. For , draw out the market supply and demand curves *with* and *without* tax, indicating and explaining the deadweight welfare loss from the tax. **(9 marks)**
3. For the same per-unit tax on producers, calculate the deadweight welfare loss as a function of the number of consumers in the market . **(10 marks)**
4. How does the deadweight welfare loss change with the number of consumers? Explain the intuition behind this. **(6 marks)**