Econ 101 Discussion Section-Handout 14

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1 Review

- Game Theory
  - Prisioners Dilema
  - Sensitive to payoff matrices
- Externalities
  - Now we are interested in see how our own behavior can affect others outcome
  - They could be positive or negative
  - Solutions: taxes, markets or property rights
- Public Good
  - Goods can be:
    - Rival: if your consumption affects others
    - Excludable: If you can prohibit the use of the good
  - Public good is: non-rival and non-excludable
  - Veritical Sum!!!

2 Problems: Game Theory, Public Goods and externalities

1. Find Nash Equilibrium of the following game

(a)

	a	b	c
A	1,4	3,0	4,2
B	4,1	2,3	1,4

2. Wonkaville is a town at the base of Candy Mountain. Several chocolate factories are located in Wonkaville, producing chocolate at an (aggregated) marginal private cost of MPC $= 3 + \frac{1}{4}$ Q, where MPC is the marginal private cost of the last unit of chocolate produced in dollars and Q is the quantity of chocolate in thousands of pounds. The marginal private benefit curve for consuming chocolate in Wonkaville is MPB $= 7 - \frac{1}{4}$ Q

   (a) What is the market quantity and price?

   (b) Suppose the production of chocolate also produces a positive aroma that makes the residents of Wonkaville happy. Specifically, there is a positive production externality of $2 per unit. What is the marginal social cost (MSC) of a unit of chocolate?

   (c) Assume there are no consumption externalities, so MSB = MPB. What is the socially optimal quantity?

(d) On a diagram illustrate the consumer surplus, producer surplus, total externalities and any deadweight loss of the market equilibrium (relative to the socially optimal outcome). Calculate these numbers.

(e) Charlie is the mayor of Wonkaville. What policy could Charlie use to achieve the optimal quantity of chocolate

3. What are the two characteristics of public goods that distinguish them from private goods?

4. Alice, Bob and Charlie are looking forward to the end of semester: they are getting tired of appearing in so many ECON101 questions! To celebrate they plan to have a fireworks display after the final exam. Their individual demand curves for fireworks are: Alice: $P = 5 - \frac{1}{4} Q$ Bob: $P = 10 - \frac{1}{2} Q$ Charlie: $P = 20 - Q$ Suppose fireworks cost \$14 each.

   (a) Draw the individual demand curves separately. If Alice, Bob and Charlie each have their own separate fireworks displays, how many fireworks will each of them buy?

   (b) Now vertically sum the three demand curves to form a market demand curve. What key feature of public goods makes vertical summation appropriate (instead of the horizontal summation we have been doing all semester?).

   (c) What is the optimal quantity of fireworks that Alice, Bob and Charlie should buy together?

   (d) How much should Alice, Bob and Charlie contribute per-firework to ensure the optimal quantity of fireworks is purchased?