Principles of Economics
Sharif University of Technology
Problem Set 2

1. **Reading: (Optional)** Becker’s book chapter 1 (lectures 1, 2)

2. **Reading:** Mankiw’s "Principles of Economics" chapters 2, 3.

3. **FOR THIS PROBLEM YOU CAN MAKE ANY REASONABLE ASSUMPTION IF YOU WANT. THERE IS NOT ONLY ONE ANSWER NECESSARILY** Assume that companies are required by law to offer their employees one of two retirement plans. Either they can have 5% of their earnings deducted automatically from their gross pay to provide an individual account for their retirement unless employees in writing ask their employer not to deduct this from their pay. This is called an “opt out” system. Or employers can deduct nothing unless employees ask in writing to have 5% deducted and added to their retirement account - this is called an “opt in” system. As “behavioral ‘economics stresses, when offered opt out, most employees do not choose to opt out, and yet when offered opt in, most employees do not choose to opt in. Many analysts want governments to require the opt out system because that is believed to lead to greater provision by employees for their retirement; that is, to greater savings.

(a) Suppose that all potential employees are identical, their best alternative is the level of utility u∗, and they know they are better off in terms of their utility, given their total wage, with having an individual retirement account provided by their employers. Yet when offered the option to opt in, they would not opt in because they ”forget” to write to do this. However, when offered the opt out system, no one opts out. Suppose employers prefer not to have to deduct pay to develop individual retirement accounts, and so prefer the opt in system, given the total compensation of employees. Would employers offer the opt in system because by assumption they prefer not to have retirement accounts (total compensation to an employee held fixed)? What is the equilibrium retirement system offered to workers by firms when the industry is
competitive? Why? Assume competitive means all firms are identical, and there is free entry.

(b) Is the equilibrium retirement system different if the industry is a monopoly?

4. [FOR THIS PROBLEM YOU CAN MAKE ANY REASONABLE ASSUMPTION IF YOU WANT. THERE IS NOT ONLY ONE ANSWER NECESSARILY] Consider the effects of placing alarms on auto deter theft. Suppose that car thieves know the fraction of cars with alarms, but do not know beforehand which cars have them. Suppose it costs thieves c to determine whether a car has an alarm, and they will not try to steal a car if it does since they will be caught with certainty. They can only find one car, and they choose a car at random to determine if it has an alarm. Suppose further that each car stolen yields $ax of revenue to the thief, where x measures the value of the car in the market, and $0 < a \leq 1$. The value of the car is completely lost to owners if their car is stolen.

(a) What determines whether a car owner installs an alarm that costs $y? How does that depend on the value of his car? How does the likelihood of installing an alarm depend on the fraction of other owners who installed them?

(b) Assume that thieves maximize expected income, and choose to try to steal a car if their expected gain from stealing exceeds their best alternative, u. How does the likelihood of becoming a car thief depend on his alternative, u, and the fraction of owners with alarms?

(c) Suppose a large number of cars relative to potential thieves. Given the distributions of u and x, what determines the equilibrium fraction of cars with alarms, and the supply of car thieves?

(d) Is the number of cars that have alarms efficient? Are their conditions under which the wealth-maximizing outcome is to have no cars with alarms?

(e) Would it be socially efficient to subsidize or tax the supply of alarms?

(f) Might it be efficient to outlaw cars displaying whether they have alarms systems (which would raise c)?