

MICRO SEMINAR 5315

PROBLEM SET 2

Instructions: All work should be **legible**. I do not accept late assignments. This assignment reviews the properties of demand.

1. A consumer faces the following objective function

$$U = U(c, L) - \beta D(h) - R$$

and faces the following constraints

$$\begin{aligned} T &= \bar{H} + L + h \\ c + Y &= w_0 \bar{H} + w_p h \end{aligned}$$

where c is consumption, L is leisure, $U_c > 0$, $U_L > 0$, $U_{cc} < 0$, $U_{LL} < 0$, $D(h)$ is a cost function with $D'(h) > 0$ and $D''(h) > 0$, β is the disutility from sex work, R is a fixed constant associated with providing $h > 0$, T is non-sleep time, \bar{H} is fixed hours spent working at the consumer's legal job, h is hours spent working in the illegal sex work industry, Y is unexpected spending, w_0 is the consumer's legal wage and w_p is the consumer's illegal wage from sex work. Solve for the following six comparative static behavioral predictions, $\frac{\partial h}{\partial w_0}$, $\frac{\partial h}{\partial w_p}$, $\frac{\partial h}{\partial \bar{H}}$, $\frac{\partial h}{\partial Y}$, $\frac{\partial h}{\partial \beta}$ and $\frac{\partial L}{\partial Y}$. For each comparative static, provide a brief description of the economic interpretation of the behavioral prediction.

2. The state of California will be voting on a law that would legalize marijuana in the state. A Police Chief writing about the imminent legislation says: "If the price drops, people are going to spend buy more and spend more money on marijuana. Low income people are going to buy marijuana instead of buying food, which happens with substance abusers." For simplicity, assume that consumers get utility from marijuana consumption and food, both of which are purchased at market prices and exogenous income. Using the police chief's statement, answer the following questions.
 - (a) (2 pts) Is the own-price elasticity of Marshallian demand greater than, equal to, or less than one (in absolute value)? Rigorously show your work.
 - (b) (2 pts) Is the cross-price elasticity of Marshallian demand for food with respect to marijuana prices positive or negative? Show the conditions under which this cross-price elasticity is elastic versus inelastic. Rigorously show your work and explain the economic meaning of your answer.
 - (c) (2 pts) Assume that the own-price elasticity of Marshallian demand for marijuana is -5 , the cross-price elasticity of Marshallian demand for marijuana (with respect to food prices) is 2 , and consumers allocate 75% of their budget to food. Is marijuana normal or inferior good? Is food a normal or inferior good. Again, rigorously show your work. Explain in a few sentences the economic lessons contained in what you found.