

Econ 131  
Spring 2021  
Emmanuel Saez

**Problem Set 3**

**DUE DATE: April 21, 11:59pm PST**

Student Name:

Student ID:

GSI Name:

- **You must submit your solutions using this template.**
- **Although you may work in groups**, each student must submit individual sets of solutions. You must note the names other students that you worked with. Write their names here:

### 1. Essay (6 points)

Read the following recent New York Times article on the inequity of property tax assessment. Write a short essay [the essay has to fit in the page below] in light of property taxation in the Tiebout model that we discussed in class. Does it make sense in the context of the Tiebout model to complain about inequitable property taxes?

NYtimes article link:

<https://eml.berkeley.edu/~saez/course131/articleps3.pdf>

## 2. True/False Statements (10 points)

Determine whether each statement is true, false, or uncertain and explain why. Answers with no explanation will receive no points.

- (a) Parks are an example of a pure public good.
- (b) There is no reason for the government to impose social distancing to fight the epidemic because private agents can create markets to price the corresponding externality.
- (c) As CO2 emissions create a classic externality, the only policy needed to solve the problem is a tax on carbon that would apply in all countries at the same rate and set equal to the marginal damage created by CO2 emissions.

- (d) A transfer of \$1bn for road maintenance funding from the federal government to the State of California has the same impact on California road maintenance spending as a \$1bn cut in federal taxes paid by California residents.
- (e) According to the Tiebout model, local public good provision is efficient and tailored to the tastes of local residents. Hence, it is better to have a fully decentralized government.

### 3. Externalities (8 points)

There are massive health concerns from cigarettes consumption. The harms are not restricted to those that choose to smoke, but to everyone that circulates in smoking environments. This is a case of negative externality on consumption. Environmental economists estimate that the marginal damage of cigarette consumption is \$2 per pack.

The aggregate demand function for cigarettes is given by  $P = 10 - 5Q^D$ , where  $Q$  is the quantity of pack of cigarettes per day in millions and  $P$  reflects the price per cigarette pack in dollars. The aggregate supply function is given by  $P = 4 + 1Q^S$ .

- (a) Solve for the equilibrium private market price and quantity that will be generated without any government intervention.

- (b) What is the socially optimal demand function taking into account externalities?

(c) Solve for the socially optimal equilibrium price and quantity.

(d) Calculate the dead-weight loss from the externality.

(e) If the government uses a cigarette tax to address this externality, what is the optimal tax to offset the externality?

(f) Calculate the revenue that would be raised by this tax.

(g) Will there be deadweight loss associated with this tax? If yes, how much? If no, why not?

(h) What are the distributional consequences of the cigarettes tax, is it a regressive, progressive or neutral tax?

#### 4. Public Goods (7 points)

Jamal and Leisha just had their first baby. They are planning on how much time to dedicate to their private leisure activities versus child caring, which can be thought as a common public good to the household. On their leisure times, Jamal appreciates watching sports on TV, while Leisha prefers to do yoga. After working, sleeping and eating, each spouse has 42 hours a month to devote to child caring ( $C_i$ ) or leisure activities ( $L_i$ ).

Jamal's utility over the time spent watching sports games and child caring is given by  $U_J = 2 \ln L_J + \ln C$  while Leisha's utility over the time spent doing yoga and child caring is given by  $U_L = 2 \ln L_L + 2 \ln C$ , where  $C$  is the total amount of time spent by both on child caring, given by the sum of each individual's contribution:  $C = C_J + C_L$ . For this problem we are assuming that both Jamal and Leisha benefit from the increases in the total amount of time they both spend on child caring  $C$  but they don't derive utility from the time the other spends on their own leisure activities.

- (a) Write down Jamal's utility maximization problem.
  
  
  
  
  
  
  
  
  
  
- (b) Find Jamal's optimal number of hours devoted to child caring ( $C_J$ ) as a function of the time on the same task spent by Leisha ( $C_L$ ).



- (c) Now, write down Leisha's utility maximization problem.
- (d) Find Leisha's optimal number of hours devoted to child caring ( $C_L$ ) as a function of the time on the same task spent by Jamal ( $C_J$ ).
- (e) Use the response functions found in (b) and (d) to find the amount of time Jamal and Leisha spend on child caring and on leisure if they optimize their own functions.

(f) From a utilitarian perspective (maximizing aggregate utility), what is the socially optimal amount of time they should spend on each task?

(g) Is the answer for (f) different than (e)? If so, why? If not, why not?