

**Econ 131**  
**Spring 2021**  
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**Midterm Exam**

**March 10**

**Exam Instructions:**

- **Explanation should be written using pens (we recommend black or blue ink, as these often scan the best).** No pencils, except for graphs.
- **Show your work.** Credit will only be awarded on the basis of what is written on the exam.
- **Sign the academic honesty pledge.** Cheating will be dealt with harshly.

Student Name:

Student ID Number:

**Affirm the academic honesty pledge below.** For those writing on a non-printed copy, please just write “Academic Honesty Pledge as on exam”, and sign your name.

**If you do not affirm this pledge, your exam will be marked invalid.**

**0. ACADEMIC HONESTY PLEDGE**

I confirm that I have abided by all academic honesty rules for UC Berkeley and Economics 131. I confirm that I did not see this exam before my official exam start time. I confirm that I have not shared and will not share this exam with anyone else. I confirm that I haven't copied from anybody else's exam.

Signature: \_\_\_\_\_

**1. True/False/Uncertain (questions 1a-g) (14 points, 2 points per question.)**

Explain your answer fully based on what was discussed in class, since all the credit is based on the explanation. Your grade depends entirely on the substance of your justification, not on whether you are correct in writing “True” or “False”. Note that it is possible to answer each question for full credit with three sentences or fewer, and answers longer than ten lines long will not be graded.

- (a) Suppose two individuals are unemployed and receive the same unemployment benefits of \$800/month. One is looking for work while the other is not. Are they both equally deserving of support?

UNCERTAIN. It depends on the social justice criterion used. Under a utilitarian social welfare criterion, they are both equally deserving because they have the same income and hence same marginal utility. However, most people social justice principles do not follow utilitarianism. Saez and Stantcheva AER’16 show that in surveys, people will overwhelmingly find that the person looking for work is more deserving. That’s why actual unemployment insurance systems typically require that people be looking for work.

- (b) The fundamental reason why governments in modern economies are so large is because human are social beings.

PROBABLY TRUE: Governments are large because of large welfare states that fund education for the young, health care for the sick, retirement benefits for the elderly, and income support for the poor. These functions are present in any human society because humans do depend on others when young, sick, or old. These functions were often done informally through family or small communities. They have been formalized through government only in the 20th century (for the most advanced economies).

- (c) Labor supply theory and changes in incentives do a pretty good job at explaining the labor force participation of single mothers in the US over the last four decades.

UNCERTAIN: it is true that the surge in labor force participation of single mothers in the US in the 1990s coincided with welfare reform and the expansion of the Earned Income Tax Credit. The old literature believed that the EITC was the key element but recent work by Kleven (2019) has cast doubt on this: other EITC expansions did not increase LFP of single mothers. Hence, it is likely that a combination of EITC, welfare reform, and changes in social norms explain the surge in the LFP of single mothers

- (d) The Biden campaign promised to increase the tax rate on realized capital gains from the current 20% to about 40% for high earners. As a result, we should observe a surge in capital gains realizations in 2020.

TRUE: When Biden won the election (in November 2020), it greatly increased the odds that the tax rate on capital gains would go up in 2021. Hence, to avoid the higher tax rates, taxpayers with accumulated capital gains have an incentive to realize them in late 2020 to benefit from the 2020 low tax rate. This phenomenon of a surge in capital gains realizations took place in 1986 and 2012, when the tax rate on realized capital gains was due to increase the subsequent year.

- (e) The new COVID bill just passed by congress sharply increases the generosity of the EITC for childless adults in 2021. According to the standard labor supply model, this is going to encourage labor supply of childless adults.

UNCERTAIN: Along the extensive margin, a more generous EITC makes work more attractive and hence unambiguously increases labor force participation. Along the intensive margin, the effect of a more generous EITC on earnings conditional on working is uncertain (negative in the phase-out and plateau and ambiguous in the phase in range). See class notes for complete details.

- (f) Evidence of bunching around the first kink point of the EITC implies that the standard economic model of labor supply works.

FALSE: While it is true that bunching at the first kink point of the EITC is predicted by the standard economic model, the evidence shows that such bunching comes from the self-employed (there is no such bunching for pure wage earners). As a result, bunching arises from the self-employed who report earnings to maximize their tax refunds (as the IRS has no easy way to verify their numbers). Therefore, this is a tax evasion phenomenon, not a labor supply phenomenon.

- (g) If the elasticity of taxable income of upper income taxpayers with respect to the net-of-tax rate is high, it is self-defeating for the government to impose a very high top marginal tax rate on the rich.

UNCERTAIN. True if the elasticity is due to real labor supply responses (as the revenue maximizing tax rate at the top is given by  $\tau = 1/(1 + a \cdot e)$  (Saez, Restud 01). However, a high taxable income elasticity is in general due to tax avoidance or evasion. By changing the definition of taxable income (broader base, fewer deductions, elimination of tax favored income items), it is possible to reduce the elasticity of taxable income and then increase the level of redistribution from rich to poor. Furthermore, if the elasticity is due to bargaining effects, then a high top tax rate is actually desirable to prevent "over compensation" of top earners at the expense of bottom 99%.

## 2. Tax Incidence (4 Points)

In Ba Sing Se, the daily demand for gallons of different varieties of tea is as follows:

- Jasmine Tea:  $Q_D^J = 140 - 2P$
- Ginger Tea:  $Q_D^G = 140 - 3P$
- White Tea:  $Q_D^W = 140 - 3P$

where  $Q_D^X$  is the quantity demanded for tea  $X$  and  $P$  is the price. The supply of each tea is the same for each variety  $Q_S = 20 + 2P$ .

- (a) The city of Ba Sing Se imposes a tax of \$2 on jasmine tea producers. What is the economic incidence of this tax on jasmine tea consumers? Note that, without the tax, the equilibrium for the jasmine tea market would be  $Q^J = 80$  and  $P = 30$ . (2 points)

$$\text{Consumer Incidence} = \frac{\varepsilon_s}{\varepsilon_s - \varepsilon_d} = \frac{2}{2 - -2} = \frac{1}{2} \text{ or } \$1$$

- (b) A city official proposes eliminating the tax on jasmine tea, and instead imposing a \$2 tax on ginger tea. Would this tax be more or less efficient (in other words, would it create less dead weight loss for the amount of revenue generated)? Why or why not (explain in one sentence)? (1 point)

Ginger tea has a more elastic demand than jasmine, and thus taxing it would create more dead weight loss.

- (c) Ba Sing Se decides to create a new tax. Would it be more efficient to impose a tax of \$6 on ginger tea than a \$3 tax on ginger tea and a \$3 tax on white tea? Why or why not (explain in one sentence)? (1 point)

Because dead weight loss is proportional to the square of the tax, it is more efficient to impose a \$3 tax on 2 teas.

### 3. Labor Income Tax (12 Points)

In the country of Examplelandia, there have historically been no taxes. A new Congress is elected in Examplelandia and implements the following tax reform: Every individual in the country will receive a universal basic income of \$50 annually, which will be paid for by a tax rate of 20% on pre-tax income over \$100 annually (this means the first \$100 is exempt and a tax of 20% applies only to the income in excess of \$100). Everyone who chooses to work can earn a wage of \$5 (pre-tax) per hour worked both before and after the reform.

- (a) For each pre-reform labor supply (in hours) in the table below, determine the sign of the substitution effect, income effect and total effect of the reform compared to a baseline with no taxes or subsidies at all, and fill in that determination on the following table. Use  $\uparrow$  to indicate if the generic effect incentivizes work,  $\downarrow$  if it disincentivizes work, 0 if there is no effect, and ? if the effect is uncertain. (5 points)

Pre-reform labor supply	Income effect	Substitution effect	Total Effect
10	$\downarrow$	0	$\downarrow$
30	$\downarrow$	$\downarrow$	$\downarrow$
80	$\uparrow$	$\downarrow$	?

- (b) Ms. Exemplar lives in Examplelandia, and has the following utility function over consumption ( $c$ ) and **labor** hours ( $l$ ):

$$U(c, l) = 9c - l^2 + 10$$

What is her optimal labor supply in terms of an arbitrary wage  $w$ ? (2 points)

By substitution we can write:  $U = 9wl - l^2 + 10$ . To maximize:

$$\frac{dU}{dl} = 0 = 9w - 0.5l$$

and thus  $l^* = 4.5w$

- (c) Assume that, like all her fellow citizens, Ms. Exemplar makes a pre-tax wage of 5. What is her optimal labor supply after the reform? (2 points)

For a wage of 4, she would work 18 hours, and for a wage of 5 she would work 22.5 hours. However, if she works 18 hours she'd make a wage of 5, and if she worked 22.5 hours, she'd make 4. Thus she bunches at the kink of  $l^* = 20$

- (d) Is Ms. Exemplar better off before or after the reform? Why or why not (explain in one sentence)? (1 point)

She is better off after the reform because, at 20 labor hours and 150 consumption, she consumes more and works less than she did before.

- (e) Assume that Ms. Exemplar moves out of Examplelandia and that everyone remaining in the country has an identical utility function expressing a taste for consumption and a distaste for labor. Their optimal labor supply given by  $l^* = 15w$ , where  $w$  is an arbitrary post-tax wage. They therefore work 75 hours before the reform and 60 hours after it.

- (i) Will the tax revenue collected under the reform be sufficient to pay for the universal basic income program? Why or why not (explain in one sentence)? (1 point)

No, at 60 hours worked the government will collect 40 worth of taxes from every citizen but be forced to pay out 50.

- (ii) What is the minimum tax rate Congress could impose on pre-tax incomes over \$100 that will fully fund the universal basic income program? Express your answer as a percentage rounded to the nearest tenth (i.e. xx.x%). (1 point) [Hard]

In general  $TR = twl^*$ , so for this case we must solve

$$50 = t \times 5 \times (15(1 - t)5 - 20)$$

The two roots are  $\frac{1}{3}$ ,  $\frac{2}{5}$  of which the minimum is 33.3 %