Econ 131

Spring 2017

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Problem Set 1

DUE DATE: February 15

Student Name:

Student ID:

GSI Name:

- **You must submit your solutions using this template.**

- **Do not write your solutions on pages that say "Do not write on this page".** Answers written on these pages will not be graded.

- **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:

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1. Essay

Read the following New York Times article and the summary of the CBO background article the New York Times refers to. Write a short essay [the essay has to fit in the page below] explaining whether the Times article accurately reported on the new CBO report. Will it be possible for the new Trump administration to cut taxes, fund infrastructure spending, while not increasing the Federal debt (relative to the current law CBO projections)?

NY Times link:

`https://www.nytimes.com/2017/01/24/us/politics/budget-deficit-trump.html`

CBO link: `https://www.cbo.gov/publication/52370`

2. True/False Statements

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

(a) The United States is a land of opportunity because kids from low income family background can succeed economically.

FALSE: See Chetty-Hendren-Kline-Saez NBER'14 paper discussed in class. Kids from low income family can sometimes succeed. However: a) Intergenerational mobility is less in the US than in other rich countries such as Denmark. b) Intergenerational mobility varies a lot across US places with some places having high mobility and others quite low mobility.

(b) 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 NBER'13 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.

(c) The progressivity of the US income tax system has decreased in recent decades.

TRUE. In the sense that tax rates on upper income groups has fallen in the recent decades. At the same time, tax rates on bottom income groups have also fallen through the development of refundable tax credits.

(d) In 1994, Michigan raised taxes on cigarettes sold in Michigan. The governor wants to know how much this tax increase changed log per-capita cigarette purchases in Michigan. In 1992, Michigan's log per-capita consumption of cigarettes was 4.7. In 1996, Michigan's log per-capita consumption of cigarettes was 4.4. In 1992, the U.S. average was 4.6. In 1996, the U.S. average was 4.5. Using these numbers to conduct a difference-in-difference (DD) analysis of Michigan cigarette consumption relative to the U.S. average between years 1992 and 1996, you should report to the governor that Michigan's cigarette tax reduced log per-capita cigarette purchases in Michigan by 0.2. (Ignore any impact of state taxes on the U.S. average. This problem is based on graphs from Evans, Ringel, Stech "Tobacco Taxes and Public Policy to Discourage Smoking" *Tax Policy and the Economy, volume 13*)

TRUE. Using the formulas from lecture, you can compute the DD estimate of the effect of the tax increase on log per-capita cigarette consumption in Michigan relative to the U.S. average: $(4.4 - 4.7) - (4.5 - 4.6) = -0.2$. Equivalently, you could have computed the DD estimate as: $(4.4 - 4.5) - (4.7 - 4.6) = -0.2$. Drawing a DD estimator table as shown in lecture can be helpful.

(e) In 1993, New York substantially raised taxes on cigarettes sold to consumers in New York. The governor of New York heard about your work for the Michigan governor and sends you a new report with the following graphs of annual data on log per-capita cigarette consumption by state and also for the U.S. on average. She then asks you for a DD estimate of the impact of New York's tax change, computed in the exact same way as you did for Michigan (except using years 1991 and 1995 instead of 1992 and 1996 for comparability).
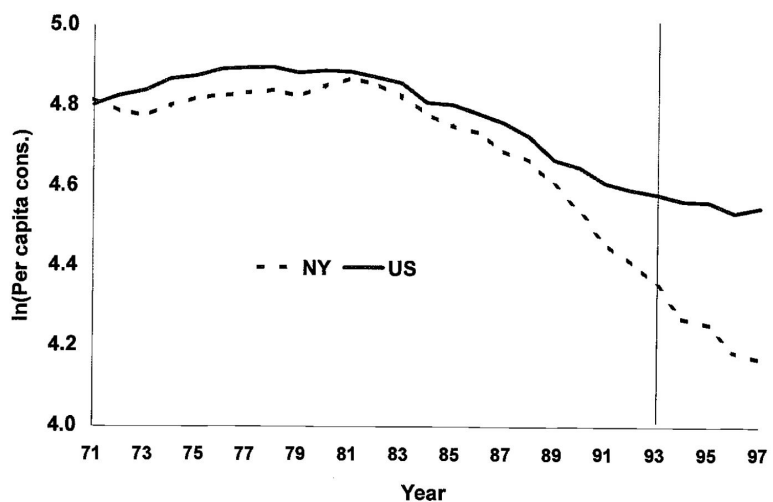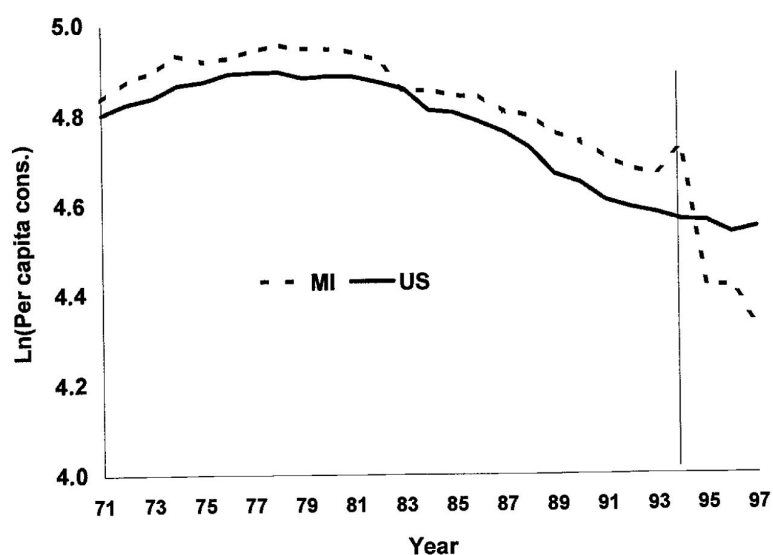
The NY graph suggests that the DD estimate for the effect of the NY tax increase on NY cigarette consumption is similar to your DD estimate for MI. You should therefore

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feel confident that the MI and NY taxes had similar effects on cigarette consumption in their respective states. (Ignore any impact of state taxes on the U.S. average. This problem is based on graphs from Evans, Ringel, Stech "Tobacco Taxes and Public Policy to Discourage Smoking" *Tax Policy and the Economy, volume 13*)

FALSE. You should feel more confident about your Michigan estimate. Michigan cigarette consumption and U.S. average cigarette consumption followed roughly parallel trends before the tax change, and then Michigan cigarette consumption declined immediately after the tax change. That suggests that the 1992-to-1996 decline in cigarette consumption was due to the tax change and not due to other slow-moving forces causing MI cigarette consumption to decline. In contrast, New York cigarette consumption and U.S. cigarette consumption did not exhibit parallel trends before New York's tax change: NY cigarette consumption was already steadily declining relative to the U.S. average long before NY's tax change. This indicates that the DD identifying assumption is violated in the New York case, so DD analysis might be very misleading in this case (i.e. NY cigarette consumption may have declined just as much in the absence of the tax change).

This example shows the value of analyzing more than just 4 data points in a DD analysis, even though 4 is the minimum necessary: by looking at many data points before the tax changes, one can see that the basic 4-data-point DD estimator is not appropriate for the NY case. (Note: There's a small spike in MI cigarette consumption in 1994. The likely reason for this is that people stock-piled cigarettes once the tax was announced but before it was implemented. This is not a big problem here because I excluded the years immediately adjacent to the tax changes in the DD examples.)

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3. Exercise: Micro Review

Assume that a person's utility over two goods is given by

$$U(x_1, x_2) = (x_1 - 3)^{\frac{1}{4}}(x_2 - 7)^{\frac{3}{4}}$$

The price of good x_1 is equal to p_1 and the price of good x_2 is p_2. The total income of the individual is given by I.

a) Write down the budget constraint of this person

The budget constrain is given by $p_1 x_1 + p_2 x_2 = I$

b) Calculate the demand for each one of the two goods

Equate the marginal rate of substitution to the price ratio to get that

$$\frac{x_2 - 10}{2(x_1 - 5)} = \frac{p_1}{p_2}$$

Write x_2 as a function of x_1:

$$x_2 = 3\frac{p_1}{p_2}(x_1 - 3) + 7$$

Plug this expression in the budget constraint to get:

$$x_1 = \frac{I + 9p_1 - 7p_2}{4p_1}$$

$$x_2 = \frac{3I - 9p_1 + 7p_2}{4p_2}$$

c) Is good x_1 a normal or an inferior good? What about good x_2? Make sure to justify your answers

To verify this, take the derivative of each one of the demand functions with respect to I and you notice that both are positive meaning that both goods are normal.

d) Calculate the own-price elasticity of demand for each one of the two goods

$$\epsilon_1 = \frac{-I + 7p_2}{I + 9p_1 - 7p_2}$$

$$\epsilon_2 = \frac{-3I + 9p_1}{3I - 9p_1 + 7p_2}$$

e) Calculate the cross-price elasticity of demand for each one of the two goods

$$\epsilon_{12} = \frac{-7p_2}{I + 9p_1 - 7p_2}$$

$$\epsilon_{21} = \frac{-9p_1}{3I - 9p_1 + 7p_2}$$