PROBLEM SET #3

2 % of grade; 12 points possible; max you can earn=10 points
DUE: via gradescope, 10:00.00 a.m. on Friday March 8
See Jan. 30 email from Prof. Olney & links on Econ 100B website re submitting PS on Gradescope

Problem sets must be uploaded and submitted by 10 am. No problem sets accepted after gradescope window closes. Your submitted work must be your own: Problem sets that are identical (in whole or in part) to another student's problem set will receive a zero.

Follow these guidelines. Write your GSI's name and your name on the first answer sheet. You can hand write or type your answers or some combination of typing & hand-written; just be sure answers are neat and legible. No answer sheet is provided; use your own paper if you are writing by hand. When you are done, you will scan your problem set answers (see gradescope hints on course website) and convert to a pdf file. No need to scan this sheet of questions. You are responsible for submitting the right pdf file. We will grade what you submit, not circle back to you to tell you that you gave us the wrong file. You must tell gradescope on which page we will find your answers. If you don't tell gradescope which page your answer is on, we won't grade what you submit. Gradescope is accessible via our bcourses site.

1. (2 points total)

a. Go to Fred (fred.stlouisfed.org), and locate the following data.

- The USD/Euro exchange rate (Dollars per 1 euro, series ID: DEXUSEU)
- Consumer Price Index for all Urban Consumers for the US (CPIAUCNS)
- Harmonized Index of Consumer Price for all items for Euro Area (CP0000EZ19M086NEST)

Create a graph in Fred that shows two lines: the nominal exchange rate between the US dollar (USD) and the euro, and the real exchange rate between these two currencies. Time period is 2000 to today. Frequency is monthly. To create the real exchange rate, you will need to edit a line to include a formula. For help, see https://fredhelp.stlouisfed.org/fred/graphs/customize-a-fred-graph/data-transformation-add-series-to-existing-line/. You will want to use the right vertical axis for one of the lines and the left vertical axis for the other. For help, see https://fredhelp.stlouisfed.org/fred/graphs/customize-a-fred-graph/change-graph-settings/

Download & embed your graph in your answers.

b. Write a paragraph about the data in which you address these questions. Do the nominal and real exchange rates always move together? If you used the nominal exchange rate rather than the real exchange rate to understand changes in the relative cost to Americans of European goods and services, would you come to the same conclusion?

2. (1 point total)

a. What is the effect of rising uncertainty on stock prices? Use a derivative to show the effect.

b. What is the effect of rising earnings on stock prices? Use a derivative to show the effect.

. . . *more*

3. (1 point total)

a. A small business owner is deciding whether to purchase new machinery for her business. She would charge the cost of the machine to her credit card, which charges 22.9 percent interest. It is a "pass-through" business; what she earns in her business is her personal income. Money she spends on the business is money she doesn't have available to spend on herself and her family. Which inflation rate is relevant in estimating her real rate of interest? Why?

b. The investment equation is $I = I_0 - I_r r$. Give two examples of things that can decrease the value of I_0.

4. (2 points total)

Using Fred, graph these two lines in one chart

- University of Michigan, Inflation Expectation
- CPI for all urban consumers, all items

Both items should be monthly, not seasonally adjusted.

a. Print out the graph and attach it to your answers.

b. Write a paragraph about the data in which you answer this question: How good are consumers at predicting the inflation rate?

5. (1 point total)

Suppose $C = C_0 + C_y(Y^D)\ and\ T = T_0 + tY$.

a. Simplify the consumption function so that you have *C=f(Y)*. The mpc is $C_y = \frac{\Delta C}{\Delta Y^D}$. Using calculus, derive the expression for the change in C due to a change in Y.

b. Suppose C_0 = \$10,000 bn per year, T_0 = \$2,000 bn per year, *t* = 15 percent, the mpc = 0.6. When GDP increases by \$1 trillion per year, how much does consumption spending change?

. . . more

6. (2 points total – ½ for a, ½ for b, 1 for c)

a. When calculating gross exports (GX), we use the real exchange rate equation $\varepsilon = \varepsilon_0 - \varepsilon_r\left(r - r^f\right)$. Is that equation an identity, equilibrium, or behavioral equation? What about $\varepsilon = \frac{e \cdot P^f}{P}$: is that equation an identity, equilibrium, or behavioral? Defend your answers.

b. Give the logical steps that take us from an increase in foreign interest rates when US interest rates are unchanged to an increase in the nominal exchange rate. Is that making the dollar weaker or stronger against other currencies? Don't just rely on the math – tell the story.

c. (From Spring 2017 final, #7b) Suppose there are two groups, Group W and Group P:

- Group W: people in group W like to take financial risks, and therefore have a high tolerance for holding foreign assets
- Group P: people in group P do not like to take financial risks, and therefore do not hold any foreign assets

Now suppose there is an increase in inequality: Wealth shifts away from Group P and toward Group W, so that a larger share of wealth is held by Group W.

What effect would this increase in inequality have on the real exchange rate? On gross exports? Defend your answers.

7. (3 points total)

(Adapted from Fall 2007, MT2, #2) Suppose the following equations describe the economy. All monetary values are billions of dollars per year.

$$\begin{aligned} C &= 1{,}000 + 0.7Y^D \\ I &= 2{,}000 - 2{,}000r \\ G &= 1{,}000 \\ \varepsilon &= 100 - 800\left(r - r^f\right) \\ r^f &= 10\ percent \\ T_0 &= 0 \\ t &= 20\ percent \\ IM &= 0.15Y \\ GX &= 600 + 10\varepsilon \end{aligned}$$

a. Simplify the aggregate demand equation until you have AD = f(Y, r).

b. Suppose we know the value of Y. Call it Y*. Solve for the equilibrium value of r.

c. Suppose instead we know the value of r. Call it r*. Solve for the equilibrium value of Y.