Problem Set #1: Due end of class September 8, 2016

You may discuss this problem set with your classmates, but everything you turn in must be your own work. Please read the "problem set guidelines" on the course web page before beginning.

1. Download PS1_Data.xlsx from the course webpage. The workbook contains the following data for each country: GDP per capita (U.S. dollars), GDP (U.S. dollars), Inward FDI stock (millions of U.S. dollars), and Outward FDI stock (millions of U.S. dollars).

   a. Turn in one well-labeled "scatter" plot with GDP per capita on the x-axis and Outward FDI stock/GDP on the y-axis. Be sure to adjust the FDI stock data for the difference in units.

   b. In a few sentences, describe what you see in the scatter plot. What is the relationship between outward FDI and GDP per capita? Is it a strong relationship?

   c. Now lets redo part a. in logarithms ("logs"). We will work with the natural log — the function `ln()` in Excel and many other computer languages. Turn in one well-labeled "scatter" plot with the logarithm of GDP per capita on the x-axis and the logarithm of Outward FDI stock/GDP on the y-axis. Be sure to adjust the FDI stock data for the difference in units before you apply the log function.

   d. In a few sentences, describe what you see in the scatter plot. What is the relationship between outward FDI and GDP per capita? Is it a strong relationship? How does this plot compare to the one in part a.?

2. Statistics (or econometrics) gives us a powerful tool for studying the relationship between two variables: the *linear regression*. As you might gather from the name, this tool works well when the two variables have a linear relationship.

   a. In your Excel graph from question 1c, add a linear trend line (if you need help with this, Google "Excel trend line").

   To draw the trend line, Excel is assuming that the data are related in a linear way,

   $$\ln\left(\frac{FDI_i}{GDP_i}\right) = \alpha + \beta \ln\left(\frac{GDP_i}{POP_i}\right) + \epsilon_i,$$

   and tries to find the two numbers α and β to make the line fit the data as well as possible.

   b. In your graph for question 1c, find the option in Excel to "display trend line equation on chart." The equation it displays is showing the values of α (the intercept of the line) and β (the slope of the line). [Note: there is nothing to turn in for parts a and b of this question. The trend line and equation for the trend line can just be a part of your graph in question 1 part c.]

   c. Report the value of the slope coefficient. In a few sentences, describe what the slope means.

3. Use the closed economy model in the notes on horizontal FDI to answer these questions. Let $w = 1.5$, $E = 200$, $\epsilon = 2$, $f^h = 1/3$, and $f^p = 1/3$.

   a. How much profit does a firm earn when $n = 10$?

   b. How many firms can the market sustain? Find the number of firms in the country (n) such that each firm earns zero profit.

   c. Let $\epsilon = 4$. How much profit does a firm earn when $n = 10$? In a few sentences, explain why your answer differs from that in part a.

   d. Let $\epsilon = 4$. How many firms can the market sustain? Find the number of firms in the country (n) such that each firm earns zero profit. In a few sentences, explain why your answer differs from that in part b.

   e. One way to measure a firm's size is by its sales. In this model, a firm's sales are its share of the total spending in the economy, $s \times E$. How did the number and the size of the firms change from part b. to part d.?

4. IKEA, the flat-pack furniture company, is, in many ways, a classic multinational: its *IKEA Industry* subsidiaries produce furniture and other items in 11 countries throughout the world. On the retail side, however, IKEA chooses to franchise. From the IKEA web site:

   "The IKEA Group franchises the IKEA retail system and methods from Inter IKEA Systems B.V. in the Netherlands. Inter IKEA Systems B.V. is the owner of the IKEA Concept and the worldwide IKEA franchisor." You can read more about IKEA franchising at http://franchisor.ikea.com/the-story-behind-franchising/

   Using the OLI framework, discuss the franchise system as it relates to IKEA. Be sure to address IKEA's ownership advantage, and what forces might have led them to franchise the retail operation rather than operate corporate stores. Limit your answer to two paragraphs.