Problem Set #3: Due end of class October 13, 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. Use the two-country model of vertical FDI we developed in class to answer the following questions. Assume that $\theta_{au} = 5$, $\theta_{as} = 1$, $\theta_{bu} = 1$, $\theta_{bs} = 10$, $w_u^1 = 10$, $w_s^1 = 20$, $w_u^2 = 2$, $w_s^2 = 30$, and $\tau = 0.05$.

   a. In Excel, create a column of τ_b that vary from 0 to 0.30 by increments of 0.01. Create the following columns, where each row differs by the value of τ_b

      1. The cost of the final good in country 1 if a and b are both made in country 1.
      2. The cost of the final good in country 1 if b is made in country 1, shipped to country 2 where a is made, and the final good is shipped to country 1.
      3. The cost of the final good in country 2 if a and b are both made in country 2.
      4. The cost of the final good in country 2 if b is made in country 1 and shipped to country 2 where a is made.
      5. The cost of the final good in country 2 if a and b are both made in country 1 and the final good is shipped to country 2.

   b. For what values of τ_b is the best firm structure complete fragmentation?

   c. For what values of τ_b is the best firm structure partial fragmentation?

   d. For what values of τ_b is the best firm structure to export from country 1?

   e. In one graph, plot each of the 5 columns against τ_b. Put τ_b on the x-axis. Clearly label the graph.

2. Redo part a. from question 1, but let $\tau = 0.15$. Why is complete fragmentation no longer viable for any level of τ_b?

True/False-Explain. Respond to the following statements by *explaining why they are true or false.* No partial credit will be awarded for stating TRUE or FALSE without explanation.

3. In the model of vertical FDI we developed in class, it is always cost-minimizing for the firm to produce the unskilled-labor intensive good in the country with low unskilled wages whenever the costs of trading are zero, $\tau_b = \tau = 0$.

4. Consider the model of vertical FDI we developed in class. Vertical FDI always generates exports from country 1 to country 2 and exports from country 2 to country 1.

5. Download PS3_Data.xlsx from the course webpage.

   - Column B is the stock of US FDI located in that country.
   - Column C is the county's GDP.
   - Column D is total exports from the US to the country.
   - Column E is the value of exports to that country that shipped between related parties — mostly multinational firms and their affiliates.

   a. Would you expect related party trade to be more important in countries with more FDI? Does it matter if the FDI is horizontal or vertical? Explain your answer.

   b. Create a variable named *related-party share* = related party exports / total exports. This variable is the share of total exports that is between related parties. Plot this variable against the logarithm of FDI/GDP. Put ln(FDI/GDP) on the x-axis. [Do not take the log of the related-party share variable.] Add the linear trend line and display the trend line equation on the chart.

   c. What is the relationship between ln(FDI/GDP) and the related-party share? Interpret the slope coefficient of the trend line.

   d. Canada and Mexico are both in the top 5 countries in terms of the related-party share. In the context of our model of vertical FDI, explain why we see so much related party trade in Canada and Mexico. [Reminder: Canada, Mexico, and the United States are members of the North American Free Trade Agreement.]