



::Solutions::

Exam 1: Fall 2017

Do not open this exam until instructed to do so.

- You have 75 minutes to complete this exam
- You may use a calculator; you may **not** use any other device (cell phone, etc.)
- You may consult one page of notes (both sides); you may not use books, notebooks, etc.
- Show your work

I will not lie, cheat, or steal to gain an academic advantage, nor will I tolerate those who do.

Signature

Printed Name

True/False-Explain. Respond to the following statements by *explaining why they are true or false*. For each statement, a complete and correct explanation is worth 10 points. No partial credit will be awarded for stating TRUE or FALSE without explanation.

1. (10 pts.) Our model of horizontal FDI predicts that Walmart should be a multinational firm.

TRUE. Our model predicts that “productive” firms are more likely to be multinationals. The model also predicts that productive firms are large, e.g. they sell a lot in their domestic market. Walmart is a large firm, which means that it is a relatively productive firm, and thus, a good candidate for multinational production.

The big idea: our model predicts that big plants are productive plants, and that productive plants make good multinationals.

2. (10 pts.) Apple, Inc. designs iOS — the iPhone operating system — in California and the iPhone itself is assembled by Foxconn (a company unaffiliated with Apple). iOS is one of Apple’s location advantages.

FALSE. iOS is an ownership advantage. iOS is an asset owned by Apple that is valuable abroad.

The big idea: what is an ownership advantage, a location advantage, and an internalization advantage?

3. (10 pts.) Most R&D performed by multinationals takes place in high-income countries.

TRUE. Most R&D takes place within the MNE parent. [This is fact #5.] Most MNE parents are located in high-income countries. [This is fact #1.]

The big idea: connect two of our “six facts” to answer the question.

4. (10 pts.) According to our model of horizontal FDI, the markup in the gasoline industry should be larger than the markup in the snack foods industry.

TRUE. The markup is $\epsilon/(\epsilon - 1)$, where ϵ is the price elasticity of demand. Gasoline (which has few substitutes) is likely to be inelastic compared to snack foods (which have lots of substitutes), so ϵ is smaller for gasoline. The smaller elasticity means the markup should be larger in the gasoline industry.

The big idea: connect markups to elasticities.

5. A US firm would like to sell its product in country 2. Using the model of horizontal direct investment, the relevant data are: $E_2 = 1000$, $\epsilon_2 = 4$, $w_{us} = 1.5$, $w_2 = 1.75$, $f^p = 6$, $f^e = 1.25$, $\varphi = 2.0$, and $\tau = 0.2$.
- a. (7 pts.) How should the firm serve country 2? As a multinational or an exporter? Provide a calculation to support your answer.

$$\begin{aligned} \pi_{us}^m(\varphi) &>? < \pi_{us}^e(\varphi) \\ \frac{1000}{4} \left(\frac{4}{4-1} \frac{1.75}{2} \right)^{1-4} - 1.75 * 6 &>? < \frac{1000}{4} \left(\frac{4}{4-1} \frac{1.5}{2} 1.2 \right)^{1-4} - 1.5 * 1.25 \\ 157.43 - 10.5 &>? < 144.67 - 1.875 \\ 146.93 &> 142.78 \end{aligned}$$

The firm should use a foreign affiliate to serve country 2.

The big idea: compute the extra profit from each mode of serving the foreign country. Compare.

- b. (7 pts.) A second US firm would also like to sell its product in country 2. Again, using the model of horizontal direct investment, the relevant data are: $E_2 = 1000$, $\epsilon_2 = 4$, $w_{us} = 1.5$, $w_2 = 1.75$, $f^p = 10$, $f^e = 1.25$, $\varphi = 2.0$, and $\tau = 0.2$. How should the firm serve country 2? Provide a calculation to support your answer.

$$\begin{aligned} \pi_{us}^m(\varphi) &>? < \pi_{us}^e(\varphi) \\ \frac{1000}{4} \left(\frac{4}{4-1} \frac{1.75}{2} \right)^{1-4} - 1.75 * 10 &>? < \frac{1000}{4} \left(\frac{4}{4-1} \frac{1.5}{2} 1.2 \right)^{1-4} - 1.5 * 1.25 \\ 157.43 - 17.5 &>? < 144.67 - 1.875 \\ 139.93 &< 142.78 \end{aligned}$$

The firm should export to country 2.

The big idea: compute the extra profit from each mode of serving the foreign country. Compare. Note that most of the calculation does not need to be redone. The export profit, for example, does not change.

- c. (10 pts.) [continued from previous page] What is different about the two firms? Give the economic intuition why this difference leads the firms to choose different ways of serving the foreign market.

The second firm has a larger fixed cost of production, f^p . The cost f^p determines how expensive it is to replicate your production in another country.

When $f^p = 6$, the savings from not shipping goods to country 2 outweighed the cost of replicating production.

When $f^p = 10$, and it is more expensive to build a production plant, the cost of building the new plant was not made up for by avoiding paying to ship the goods to country 2.

The big idea: firms trade off paying a larger fixed cost to be a MNE against paying larger variable costs to export.

6. In the last few decades, Chinese GDP per capita has been growing rapidly.
- a. (5 pts.) How should we expect inward foreign direct investment to change in China?

We expect it to increase.

The big idea: let's apply what we have learned to think about emerging markets.

- b. (7 pts.) [continued from previous page] State the relevant version of the proximity-concentration tradeoff that justifies your answer to part a.

We should find more foreign serving the market (or more FDI in the market) rather than exporters when:

1. the market is larger
2. variable export costs are larger
3. production fixed costs are smaller

The big idea: the proximity-concentration tradeoff really is one of the “big ideas” from the first part of the semester!

- c. (7 pts.) Explain how the proximity-concentration tradeoff accounts for your answer in part a.

China is growing, and becoming a larger market. According to the proximity-concentration tradeoff, larger markets should see more FDI activity.

The big idea: support our answer from part a. with what we have learned from the models.

7. A firm in the United States would like to serve the United Kingdom (uk) and Slovakia (sk). It has narrowed down its choices to either operating a plant in the UK and using it to serve the UK and Slovakia, or operating a plant in Slovakia and using it to serve the UK and Slovakia. The US firm has productivity $\varphi = 2$, and the two economies can be described by $\epsilon_{uk} = \epsilon_{sk} = 3$, $f^p = 1.25$, $f^e = 0.75$, $\tau_{uk,sk} = \tau_{sk,uk} = 0.3$, $E_{uk} = 500$, $E_{sk} = 100$, $w_{uk} = 1.1$, $w_{sk} = 0.6$.
- a. (10 pts.) Where will the US firm locate its plant? What is the total profit earned by the firm in these two markets?

If the export platform is in the UK,

$$\pi = \frac{E_{uk}}{\epsilon_{uk}} \left(\frac{\epsilon_{uk}}{\epsilon_{uk} - 1} \frac{w_{uk}}{\varphi} \right)^{1-\epsilon_{uk}} + \frac{E_{sk}}{\epsilon_{sk}} \left(\frac{\epsilon_{sk}}{\epsilon_{sk} - 1} \frac{w_{uk}}{\varphi} (1 + \tau_{uk,sk}) \right)^{1-\epsilon_{sk}} - w_{uk} f^p - w_{uk} f^e$$

$$\pi = \frac{500}{3} \left(\frac{3 \cdot 1.1}{2 \cdot 2} \right)^{-2} + \frac{100}{3} \left(\frac{3 \cdot 1.1}{2 \cdot 2} (1.3) \right)^{-2} - 1.1 * 1.25 - 1.1 * 0.75 = 271.65$$

If the export platform is in Slovakia,

$$\pi = \frac{E_{uk}}{\epsilon_{uk}} \left(\frac{\epsilon_{uk}}{\epsilon_{uk} - 1} \frac{w_{sk}}{\varphi} (1 + \tau_{sk,uk}) \right)^{1-\epsilon_{uk}} + \frac{E_{sk}}{\epsilon_{sk}} \left(\frac{\epsilon_{sk}}{\epsilon_{sk} - 1} \frac{w_{sk}}{\varphi} \right)^{1-\epsilon_{sk}} - w_{sk} f^p - w_{sk} f^e$$

$$\pi = \frac{500}{3} \left(\frac{3 \cdot 0.6}{2 \cdot 2} (1.3) \right)^{-2} + \frac{100}{3} \left(\frac{3 \cdot 0.6}{2 \cdot 2} \right)^{-2} - 0.6 * 1.25 - 0.6 * 0.75 = 650.42$$

The firm should build an export platform in Slovakia.

The big idea: compute profits from both configurations. Compare.

- b. (7 pts.) Where should the firm locate its plant when $\tau_{uk,sk} = \tau_{sk,uk} = 0.0$? Explain your answer.

The plant should still be located in Slovakia. You can argue this in two ways:

1. Redo the calculations from part a., and show that locating in Slovakia is profit maximizing.
2. Argue that the only reason to locate production in a more expensive location (the wage in the UK is higher) is if it saves you on variable export costs. If variable export costs are zero, then there is no reason to locate production in the more expensive country.

The big idea: when there are no costs of trading, always produce where it is cheapest. Compare this to the practice exam, where there were non-zero trade costs, and wages were not very different. In that case, the solution was to locate in the country where you will sell the most.

Extra Space

Clearly label the question number, and leave a reference to this page near the question.