::Solutions::

Practice Exam 1

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 *explaing 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.) Turkey, a country with a GDP per capita about 50 percent as large as France and Germany, is a candidate for membership in the European Union. If Turkey joins the European Union, we expect to see a significant increase in foreign direct investment in Turkey.

   TRUE. Turkey's low GDP per capita (relative to the EU) and its proximity to the EU make it an ideal location for export platform FDI. Once Turkey joins the EU, it will face very low barriers to exporting into the EU.

2. (10 pts.) Pfizer, the multinational drug company, holds the patent on the pain medication Lyrica. In the OLI framework, this patent is an internalization advantage.

   FALSE. The patent is an ownership advantage. A multinational's ownership advantage are the assets the firm owns that generates enough value to make it worth the extra cost of being a multinational.

3. (10 pts.) In our model in which firms are heterogeneous in productivity, more productive firms are more likely to be multinationals, because they face smaller fixed costs.

FALSE. All firms face the same fixed costs, and the export fixed cost is smaller than the production fixed cost. More productive firms earn larger operating profits because they can charge lower prices. These more productive firms can cover the greater fixed cost of being a multinational, while lower productivity firms cannot.

4. (10 pts.) The proximity-concentration tradeoff predicts that we should see more multinational activity in industries characterized by increasing returns to scale in production.

FALSE. When increasing returns to scale are important, the firm would like to produce in a very few (but large) locations. It would not want to spread its production across many locations. This is exactly the "concentration" idea in the proximity-concentration tradeoff.

5. Use the model with heterogenous firms that we developed in class to answer the following questions. Assume that $E_2 = 1000$, $\epsilon_2 = 4$, $w_1 = 1.5$, $w_2 = 1.5$, $f^p = 6$, $f^e = 1.25$, and $\tau = 0.2$.

   a. (5 pts.) What is the productivity level (φ) of the smallest firm in country one that exports to country two? Call this level of productivity $\underline{\varphi}^e$.

$$\pi_1^e(\underline{\varphi}^e) = \frac{E_2}{\epsilon_2}\left(\frac{\epsilon_2}{\epsilon_2 - 1}\frac{1}{\underline{\varphi}^e}w_1(1+\tau)\right)^{1-\epsilon_2} - w_1 f^e = 0$$

$$\left(\frac{E_2}{w_1 f^e \epsilon_2}\right)^{\frac{1}{1-\epsilon_2}}\left(\frac{\epsilon_2}{\epsilon_2 - 1}w_1(1+\tau)\right) = \underline{\varphi}^e$$

$$\left(\frac{1000}{1.5 * 1.25 * 4}\right)^{\frac{1}{-3}}\left(\frac{4}{3} * 1.5 * (1.2)\right) = \underline{\varphi}^e = 0.4698$$

   b. (3 pts.) Show that a country-one firm with $\underline{\varphi}^m = 0.815$ is indifferent between exporting to country two and operating a foreign affiliate in country two.

An exporter with $\underline{\varphi}^m = 0.815$ earns profit

$$\pi_1^e(\underline{\varphi}^m) = \frac{E_2}{\epsilon_2}\left(\frac{\epsilon_2}{\epsilon_2 - 1}\frac{1}{\underline{\varphi}^m}w_1(1+\tau)\right)^{1-\epsilon_2} - w_1 f^e$$

$$\pi_1^e(\underline{\varphi}^m) = \frac{1000}{4}\left(\frac{4}{3}\frac{1}{0.815} * 1.5(1.2)\right)^{-3} - 1.5 * 1.25 = 7.912$$

A multinational with $\underline{\varphi}^m = 0.815$ earns profit

$$\pi_1^m(\underline{\varphi}^m) = \frac{E_2}{\epsilon_2}\left(\frac{\epsilon_2}{\epsilon_2 - 1}\frac{1}{\underline{\varphi}^m}w_2\right)^{1-\epsilon_2} - w_2 f^p$$

$$\pi_1^m(\underline{\varphi}^m) = \frac{1000}{4}\left(\frac{4}{3}\frac{1}{0.815} * 1.5\right)^{-3} - 1.5 * 6 = 7.912$$

The firm earns the same profit as an exporter or a multinational, so the firm is indifferent between the two ways to serve country 2.

c. (8 pts.) Explain why $\underline{\varphi}^e < \underline{\varphi}^m$.

The operating profit of a firm is increasing in its productivity. More productive firms charge lower prices and have larger market shares.

The fixed cost to export is smaller than the fixed cost of producing in the foreign market, so a firm needs to earn fewer operating profits in the foreign country to pay for its fixed costs.

So a less productive firm (like one with productivity $\underline{\varphi}^e$) can earn enough profit to cover the exporting fixed cost, but not the larger fixed cost of producing in the foreign market.

d. (13 pts.) Suppose that τ decreases to 0.05. How do $\underline{\varphi}^e$ and $\underline{\varphi}^m$ change? Do *not* compute the new values $\underline{\varphi}^e$ and $\underline{\varphi}^m$, but rather, explain why they change.

The cutoff productivity to export will decrease.

Lowering the trade cost makes exporting a more profitable endeavor. The increased profitability of exporting will allow some firms — those with φ just below $\underline{\varphi}^e$ — to make enough profit to cover the export fixed costs. So the break-even level of productivity to export falls.

The cutoff productivity to become a multinational will increase.

In this case, firms with φ just above $\underline{\varphi}^m$ will find that the extra profit they can earn as exporters makes it optimal to pay the smaller fixed cost and export, rather than be a multinational.

Graphically, you can see how this would work in figure 2 in the note HFDI III. Decreasing the export cost makes the red dashed line (export profits) steeper.

6. Use the two-country model with identical firms that we developed in class to answer the following questions. Assume that $E_1 = E_2 = 500$, $\epsilon_1 = \epsilon_2 = 2$, $w_1 = w_2 = 1.0$, $f^p = 0.5$, $f^h = 0.25$.

   The two countries differ in their level of import protection: Country two imposes a larger import tax on country-one exports. A country-one exporter earns market share $\rho_{12}s_2$ in the foreign market and a country-two exporter earns market share $\rho_{21}s_1$ in the foreign market. Assume that $\rho_{12} = 0.6 < 0.8 = \rho_{21}$.

   a. (6 pts.) Suppose that the two countries do not allow multinational production, so the only way firms can serve the foreign market is by exporting. What is the profit earned by a firm in country one and a firm in country two when $n_1 = n_2 = 5$?

   The domestic firm share in country 1 is $1/(5 + 5 * 0.8) = 0.111$.
   The domestic firm share in country 2 is $1/(5 + 5 * 0.6) = 0.125$.

$$\pi_1 = 0.111\frac{500}{2} + (0.125 * 0.6)\frac{500}{2} - 1.0 * 0.5 - 1.0 * 0.25 = 45.75$$
$$\pi_2 = (0.111 * 0.8)\frac{500}{2} + 0.125\frac{500}{2} - 1.0 * 0.5 - 1.0 * 0.25 = 52.70$$

Countries one and two are considering opening their markets to multinational foreign affiliates from the other country. If this policy was enacted, research suggests that two firms in each country would become multinationals: There will be $m_1 = m_2 = 2$ multinational firms and $n_1 = n_2 = 3$ domestic firms.

b. (6 pts.) Which country's domestic firms would be hurt the most by this legislation? Show the calculations that support your answer.

The domestic firm share in country 1 is now $1/(2+3+2+3*0.8) = 0.106$.
The domestic firm share in country 2 is now $1/(2+3+2+3*0.6) = 0.114$.

$$\pi_1 = 0.106\frac{500}{2} + (0.114*0.6)\frac{500}{2} - 1.0*0.5 - 1.0*0.25 = 42.85$$
$$\pi_2 = (0.106*0.8)\frac{500}{2} + 0.114\frac{500}{2} - 1.0*0.5 - 1.0*0.25 = 48.95$$

Country two's domestic firms are hurt more; they lose more profit going from a world without multinationals to a world with multinationals.

c. (6 pts.) Which country's multinational firms would gain more from this legislation? Show the calculations that support your answer.

$$\pi_1^m = 0.106\frac{500}{2} + 0.114\frac{500}{2} - 1.0*0.5 - 1.0*0.5 - 1.0*0.25 = 53.75$$
$$\pi_2^m = 0.106\frac{500}{2} + 0.114\frac{500}{2} - 1.0*0.5 - 1.0*0.5 - 1.0*0.25 = 53.75$$

Country one's multinationals gain more. They earned 45.75 in profit as domestic firms, and now earn 53.75. Country two's firms earned 52.70 as domestic firms and earn 53.75 as multinationals.

d. (13 pts.) Explain the intuition behind your findings in parts b. and c. What is it about countries that drive your results?

The difference in trade costs (which shows up in the two ρ) drive the results. When exports are the only way to serve the foreign market, the higher trade costs faced by country-one exporters shields the domestic firms in country two from competition.

With the new policy, multinationals replace some of the exporters. In country two, some of the disadvantaged exporters from country one are replaced by multinationals who do not face the high export costs. This increases the competition in country two more than in country one.

Since competition increases more in country two than in country one, country one's multinationals gain more and country two's domestic firms are hurt more.

Extra Space

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