

Multinationals and the Globalization of Production

Horizontal FDI: II

Penn State // Fall 2017

Administrative things

- ▶ Sign in to Arkaive.com (course code: 84ST)
 - ▶ If not working, sign in up front
- ▶ PS #1 is graded and available up front
- ▶ Solutions are on the course web page
 - ▶ Five problem sets, each worth 1% of final score
 - ▶ “✓+” perfect or almost perfect (worth 1%)
 - ▶ “✓” mostly correct (worth 1%)
 - ▶ “✓-” mostly incorrect (worth 0%)
- ▶ My philosophy on problem sets...

Roadmap

- ▶ Past: OLI framework
 - ▶ Identify MNE advantage
 - ▶ High-level analysis MNE facts
- ▶ Present: Towards a model of horizontal FDI
 - ▶ Introduce a model of competition
 - ▶ The closed economy
 - ▶ Open economy with exporters and MNEs
 - ▶ Formalize the proximity-concentration tradeoff

Horizontal FDI

- ▶ Horizontal FDI: Use affiliates to serve foreign market
- ▶ Relevant facts
 - ▶ More multinational activity in bigger markets
 - ▶ More multinational activity (compared to exports) with distance
- ▶ Important model ingredients
 - ▶ Exporting requires additional costs
 - ▶ Building a foreign affiliate requires a fixed cost
- ▶ Key tradeoff in the model
 - ▶ Saving on transport costs vs. saving on production fixed costs
 - ▶ Called the “proximity-concentration tradeoff”

Model overview

- ▶ A firm would like to serve a foreign market. How?
 - ▶ Should it produce at home and export? (an exporter)
 - ▶ Should it produce abroad? (an MNE)
- ▶ The firm makes an either-or decision
 - ▶ We call these *discrete choice models*
- ▶ To solve a discrete choice model
 - ▶ Compute the profit from each choice (exporter, MNE)
 - ▶ Choose the one with the highest profit

Exporters

- ▶ Pay export fixed costs f^e and trade cost τ
- ▶ How much extra profit does the firm earn from exporting?

$$p_e = \frac{w_1}{\varphi} \frac{\epsilon_2}{\epsilon_2 - 1} (1 + \tau)$$

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

Multinational firms

- ▶ Pay production fixed cost f^p abroad; avoid τ and f^e
- ▶ How much profit does the firm earn from affiliate sales?

$$p_m = \frac{w_2}{\varphi} \frac{\epsilon_2}{\epsilon_2 - 1}$$

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

When does a firm choose FDI over exporting?

- ▶ A country-1 firm serves country 2 by FDI when

$$\Delta\pi_1^m(\varphi) > \Delta\pi_1^e(\varphi)$$

- ▶ Substitute definitions...

$$\frac{1}{\epsilon_2} \left(\frac{\epsilon_2}{\epsilon_2 - 1} \frac{w_2}{\varphi} \right)^{1-\epsilon_2} E_2 - w_2 f^p > \frac{1}{\epsilon_2} \left(\frac{\epsilon_2}{\epsilon_2 - 1} \frac{w_1}{\varphi} (1 + \tau) \right)^{1-\epsilon_2} E_2 - w_1 f^e$$

- ▶ Rearrange...

$$\frac{1}{\epsilon_2} \left(\frac{\epsilon_2}{\epsilon_2 - 1} \frac{w_2}{\varphi} \right)^{1-\epsilon_2} E_2 - \frac{1}{\epsilon_2} \left(\frac{\epsilon_2}{\epsilon_2 - 1} \frac{w_1}{\varphi} (1 + \tau) \right)^{1-\epsilon_2} E_2 > w_2 f^p - w_1 f^e$$

When does a firm choose FDI over exporting?

$$\underbrace{\frac{1}{\epsilon_2} \left(\frac{\epsilon_2}{\epsilon_2 - 1} \frac{w_2}{\varphi} \right)^{1-\epsilon_2} E_2 - \frac{1}{\epsilon_2} \left(\frac{\epsilon_2}{\epsilon_2 - 1} \frac{w_1}{\varphi} (1 + \tau) \right)^{1-\epsilon_2} E_2}_{\text{Difference in variable profit}} > \underbrace{w_2 f^p - w_1 f^e}_{\text{Difference in fixed costs}}$$

► Suppose $w_1 = w_2 = w$

$$\frac{1}{\epsilon_2} \left(\frac{\epsilon_2}{\epsilon_2 - 1} \frac{w}{\varphi} \right)^{1-\epsilon_2} E_2 - \frac{1}{\epsilon_2} \left(\frac{\epsilon_2}{\epsilon_2 - 1} \frac{w}{\varphi} (1 + \tau) \right)^{1-\epsilon_2} E_2 > w f^p - w f^e$$

When does a firm choose FDI over exporting?

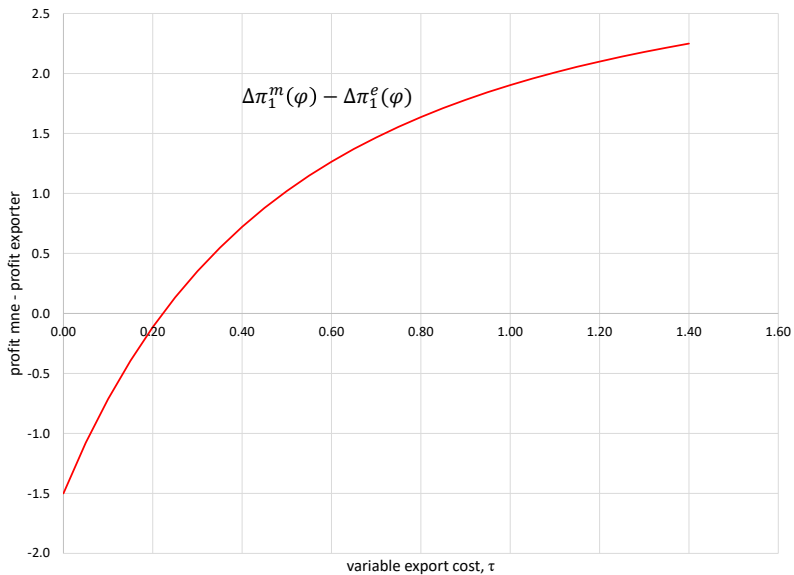
- ▶ A country-1 firm serves country 2 by FDI when

$$\Delta\pi_1^m(\varphi) > \Delta\pi_1^e(\varphi)$$

$$\Delta\pi_1^m(\varphi) - \Delta\pi_1^e(\varphi) > 0$$

- ▶ How does this change with
 - ▶ “distance,” τ ?
 - ▶ market size, E_2 ?
 - ▶ returns to scale in production, f^p ?
- ▶ Note that we are holding φ fixed

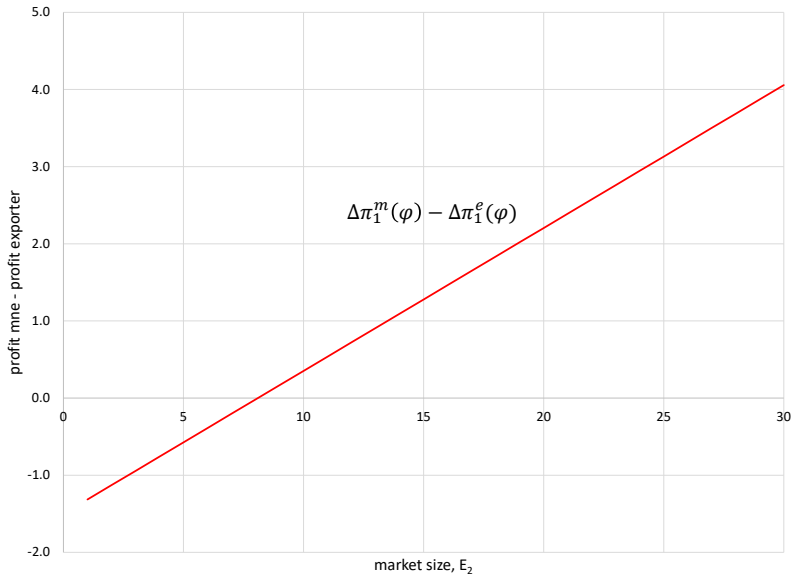
Variable export costs



Variable export costs

- ▶ Why is $\Delta\pi_1^m(\varphi) - \Delta\pi_1^e(\varphi) < 0$ when $\tau = 0$?
- ▶ Why is $\Delta\pi_1^m(\varphi) - \Delta\pi_1^e(\varphi)$ increasing in τ ?
- ▶ Why is $\Delta\pi_1^m(\varphi) - \Delta\pi_1^e(\varphi)$ concave in τ ?

Market size

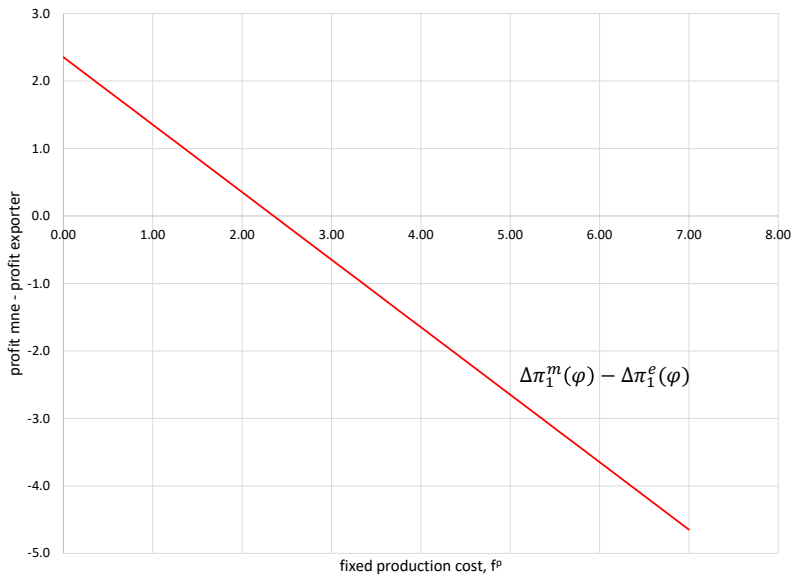


Market size

- ▶ Why is $E_2 = 0$ a silly value?

- ▶ Why is $\Delta\pi_1^m(\varphi) - \Delta\pi_1^e(\varphi)$ increasing in E_2 ?

Fixed production cost



Fixed production cost

- ▶ Why is $\Delta\pi_1^m(\varphi) - \Delta\pi_1^e(\varphi) > 0$ when $f^p = 0$?
- ▶ Why is $\Delta\pi_1^m(\varphi) - \Delta\pi_1^e(\varphi)$ decreasing in f^p ?
- ▶ What does this have to do with increasing returns to scale?
- ▶ How is this result related to the size of E_2 ?

The proximity-concentration tradeoff

- ▶ For a given φ , a firm is more likely to use a foreign affiliate to serve the foreign market, rather than exporting, when
 1. the foreign market is larger (larger E_2)
 2. variable export costs are larger (larger τ)
 3. production fixed costs are smaller (smaller $w_2 f^p$)

Takeaways

- ▶ Exporters pay higher variable costs to serve the foreign market
- ▶ Multinationals skip higher export costs, but pay more fixed costs
- ▶ *Proximity-concentration tradeoff*: For a given φ , a firm is more likely to use a foreign affiliate to serve the foreign market, rather than exporting, when
 - ▶ the foreign market is larger
 - ▶ exporting variable costs are larger
 - ▶ fixed production costs are smaller