

Multinationals and the Globalization of Production

Export Platforms

Penn State // Fall 2016

Administrative things

- ▶ Arkaive.com course code: 3D0Y
 - ▶ Please sign in

- ▶ Problem Set #2
 - ▶ Hand in at table up front

- ▶ Exam I
 - ▶ In class, Thursday September 29
 - ▶ Review session, in class Tuesday September 27

Exam I: Thursday 9/29

- ▶ Exam duration is 75 minutes
- ▶ We will start on time; arrive early
- ▶ Bring
 - ▶ Calculator
 - ▶ One page of notes (8.5"x11")
 - ▶ No wireless devices or other materials
- ▶ Show your work!

Exam I: Thursday 9/29

- ▶ Covers everything up to and including today
- ▶ Data
 - ▶ Need to know “stylized” facts
 - ▶ Do not need to know the actual numbers
 - ▶ Yes: “GDP per capita is positively related to outward FDI”
 - ▶ No: “Outward FDI/GDP in Angola is 0.057”
- ▶ Graphing
 - ▶ Will not ask you to make graphs — no computers allowed
 - ▶ May show you a graph, ask for interpretation

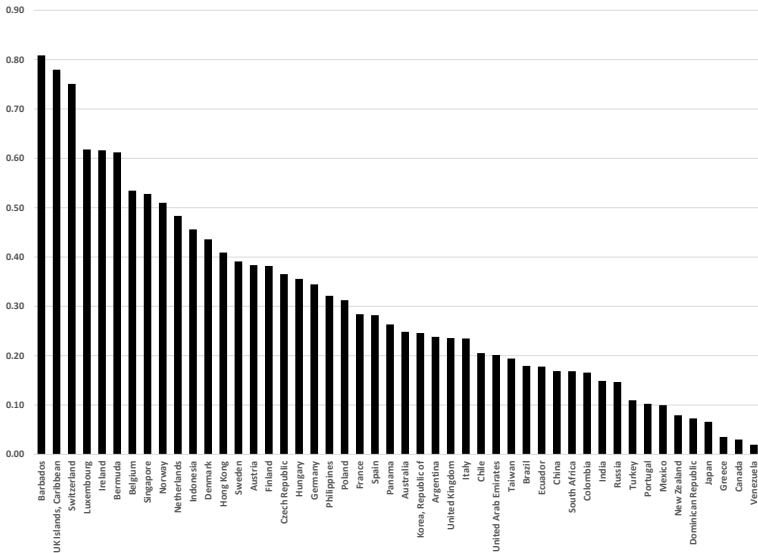
Exam I: Thursday 9/29

- ▶ How to study
 - ▶ Review on Tuesday
 - ▶ Problem sets — solutions online
 - ▶ Slides and notes
 - ▶ Practice exam (timed?)
- ▶ As you study, create your notes page
 - ▶ What was emphasized in class?

Roadmap

- ▶ Past: Models of horizontal FDI
 - ▶ Identical firms — proximity concentration tradeoff
 - ▶ Heterogeneous firms — more productive firms become MNEs
- ▶ Present: Export platform FDI
 - ▶ So far, an affiliate in country j serves only country j
 - ▶ PS#2: not all affiliate sales go to host country
 - ▶ Let an affiliate in country j serve foreign country k , too
- ▶ Future: Review, Exam I
 - ▶ Will start models of vertical FDI in two weeks
 - ▶ Produce in other countries to save factor costs

Share of total sales to third countries (US affiliates)



Who ships where?

- ▶ Non-production FDI (e.g. holding companies)
 - ▶ Mostly exist for tax and accounting reasons
 - ▶ Barbados, Bermuda, UK Isl., Luxembourg (a bit Switzerland)

- ▶ Export platforms
 - ▶ Ship significant output to third countries
 - ▶ Small, close to other markets, (sometimes) cheap
 - ▶ Switzerland, Ireland, Norway, Singapore, Netherlands

- ▶ Countries with almost no export platform sales
 - ▶ Sell mostly within the host, or to the US
 - ▶ Big, remote, expensive (or close to US)
 - ▶ Japan, New Zealand (Canada, Mexico)

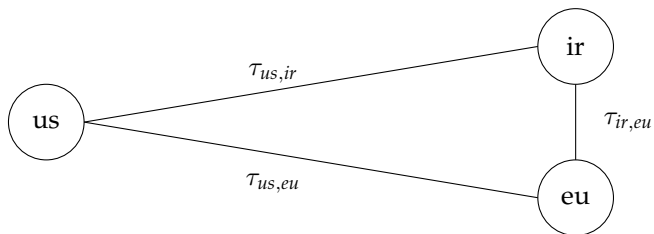
Export platforms in the model

- ▶ Start with: heterogeneous firm model
 - ▶ Add a third country

- ▶ Under what conditions do export platforms arise?
 - ▶ Depends on geography and costs

- ▶ Three countries: United States (us), Ireland (ir), European Union (eu)

Geography



- ▶ US is far from Ireland and EU
- ▶ Ireland and EU are close

Firm configurations

- ▶ A US firm wants to serve Ireland and EU
- ▶ Six ways to do so
 1. Export to *eu* from *us*, export to *ir* from *us*
 2. Multinational affiliate in *eu*, export to *ir* from *us*
 3. Export to *eu* from *us*, multinational affiliate in *ir*
 4. Multinational affiliate in *eu*, multinational affiliate in *ir*
 5. Multinational affiliate in *eu*, export to *ir* from *eu*
 6. Export to *eu* from *ir*, multinational affiliate in *ir*
- ▶ As number of countries grows, number of choices explodes

Simplify the model

- ▶ Six ways to configure the firm
- ▶ The usual approach: compute profits from each, compare
 - ▶ Drawback: tedious
- ▶ Make some assumptions to simplify and focus our analysis
- ▶ Assumption 1: $\tau_{us,eu}$ and $\tau_{us,ir}$ are very large
 - ▶ US firm always wants to be MNE (proximity-concentration)
 - ▶ Rules out configurations where US firm exports: #1– #3
- ▶ Assumption 1: $w_{ir} < w_{eu}$
 - ▶ Rules out EU as an export platform: #5

Two choices

- ▶ Our simplifying assumptions leave us with
 - #4 Multinational affiliate in *eu*, multinational affiliate in *ir*
 - #6 Export to *eu* from *ir*, multinational affiliate in *ir*
- ▶ Compare profit, choose the configuration that delivers most profit

Affiliates in both countries (#4)

- ▶ Pay two production fixed costs (f^p)
- ▶ No export costs (τ)

$$\pi_{us}^{m,m}(\varphi) = \frac{E_{ir}}{\epsilon_{ir}} \left(\frac{\epsilon_{ir}}{\epsilon_{ir} - 1} \frac{w_{ir}}{\varphi} \right)^{1-\epsilon_{ir}} + \frac{E_{eu}}{\epsilon_{eu}} \left(\frac{\epsilon_{eu}}{\epsilon_{eu} - 1} \frac{w_{eu}}{\varphi} \right)^{1-\epsilon_{eu}} - w_{ir}f^p - w_{eu}f^p$$

Affiliate in Ireland, export to EU from IR (#6)

- ▶ Production fixed cost (f^p) and export fixed cost (f^e)
- ▶ Export costs ($\tau_{ir,eu}$)

$$\pi_{us}^{xp,m}(\varphi) = \frac{E_{ir}}{\epsilon_{ir}} \left(\frac{\epsilon_{ir}}{\epsilon_{ir} - 1} \frac{w_{ir}}{\varphi} \right)^{1-\epsilon_{ir}} + \frac{E_{eu}}{\epsilon_{eu}} \left(\frac{\epsilon_{eu}}{\epsilon_{eu} - 1} \frac{w_{ir}}{\varphi} (1 + \tau_{ir,eu}) \right)^{1-\epsilon_{eu}} - w_{ir}f^p - w_{ir}f^e$$

- ▶ Trade off smaller fixed costs with the added variable cost of exporting

Optimal configuration

- ▶ Use an export platform when it is more profitable
- ▶ Profit from selling in Ireland cancels out
- ▶ Difference in profit is

$$\begin{aligned} \pi_{us}^{xp,m}(\varphi) - \pi_{us}^{m,m}(\varphi) = & \\ & \frac{E_{eu}}{\epsilon_{eu}} \left(\frac{\epsilon_{eu}}{\epsilon_{eu} - 1} \frac{w_{ir}}{\varphi} (1 + \tau_{ir,eu}) \right)^{1-\epsilon_{eu}} - \frac{E_{eu}}{\epsilon_{eu}} \left(\frac{\epsilon_{eu}}{\epsilon_{eu} - 1} \frac{w_{eu}}{\varphi} \right)^{1-\epsilon_{eu}} \\ & + (w_{eu}f^p - w_{ir}f^e) \end{aligned}$$

Optimal configuration

$$\begin{aligned} \pi_{us}^{xp,m}(\varphi) - \pi_{us}^{m,m}(\varphi) = & \\ & \frac{E_{eu}}{\epsilon_{eu}} \left(\frac{\epsilon_{eu}}{\epsilon_{eu} - 1} \frac{w_{ir}}{\varphi} (1 + \tau_{ir,eu}) \right)^{1-\epsilon_{eu}} - \frac{E_{eu}}{\epsilon_{eu}} \left(\frac{\epsilon_{eu}}{\epsilon_{eu} - 1} \frac{w_{eu}}{\varphi} \right)^{1-\epsilon_{eu}} \\ & + (w_{eu}f^p - w_{ir}f^e) \end{aligned}$$

- ▶ Second term on r.h.s. is always positive since $f^e < f^p$
- ▶ First term depends on

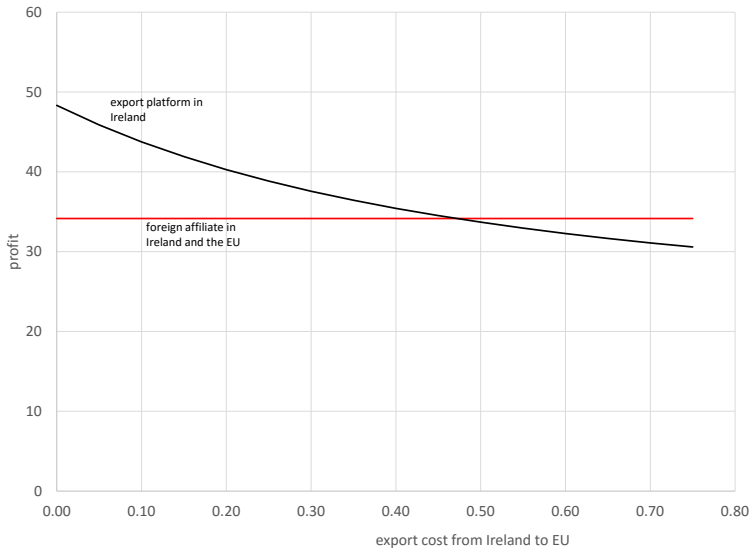
$$\left(\frac{w_{ir}}{\varphi} (1 + \tau_{ir,eu}) \right)^{1-\epsilon_{eu}} - \left(\frac{w_{eu}}{\varphi} \right)^{1-\epsilon_{eu}} = \frac{1}{\left(\frac{w_{ir}}{\varphi} (1 + \tau_{ir,eu}) \right)^{\epsilon_{eu}-1}} - \frac{1}{\left(\frac{w_{eu}}{\varphi} \right)^{\epsilon_{eu}-1}}$$

Optimal configuration

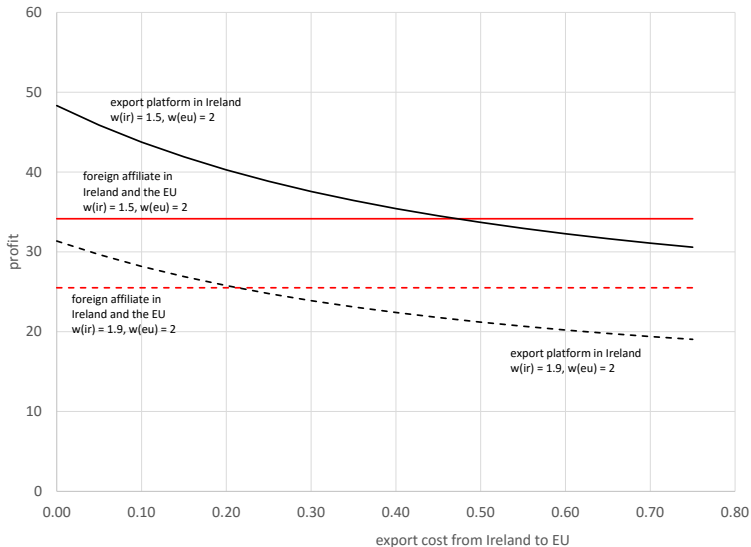
$$\left(\frac{w_{ir}}{\varphi}(1 + \tau_{ir,eu})\right)^{1-\epsilon_{eu}} - \left(\frac{w_{eu}}{\varphi}\right)^{1-\epsilon_{eu}} = \frac{1}{\left(\frac{w_{ir}}{\varphi}(1 + \tau_{ir,eu})\right)^{\epsilon_{eu}-1}} - \frac{1}{\left(\frac{w_{eu}}{\varphi}\right)^{\epsilon_{eu}-1}}$$

- ▶ If $\tau_{ir,eu} = 0$, always use Ireland as an export platform ($w_{ir} < w_{eu}$)
- ▶ As $\tau_{ir,eu}$ increases, above term becomes negative
 - ▶ This is proximity-concentration tradeoff again
- ▶ Larger difference in production cost ($w_{ir} \ll w_{eu}$), more likely to be export platform

Profit



Profit, increasing the Irish wage



Takeaways

- ▶ When do export platforms arise?
- ▶ We expect to see export platforms when the
 1. foreign markets (Ireland, EU) are far from the home market (US),
 2. the export costs between the two foreign markets are small, and
 3. one of the foreign markets has low marginal cost