Multinationals and the Globalization of Production

Export Platforms

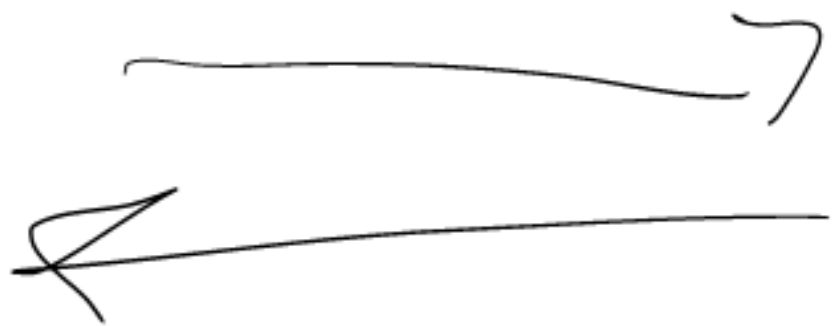
Penn State // Fall 2017

FOMC

1. No change in i rates

2. Begin rolling back QE

Exchange $ for T-bills



Administrative things

- Arkaive.com course code: [illegible]
  - Please sign in
- Problem Set #2
  - Due September 28
  - Available this afternoon on course web
- In-class mini-case
  - In class, Tuesday September 26
  - Prepare background questions
  - Readings + questions on course web
  - Overlaps with PS #2 (and the exam)

Roadmap

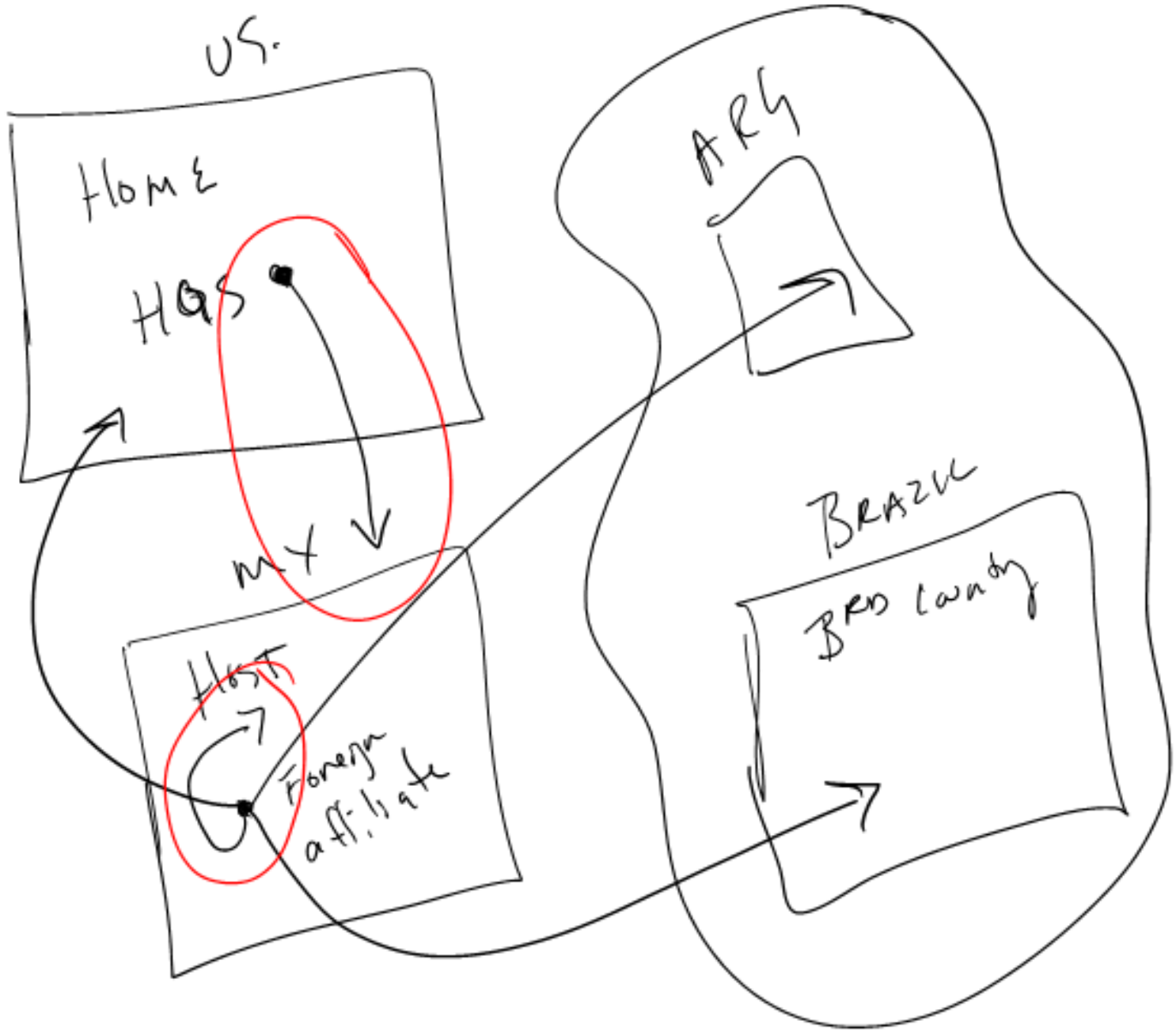
- Past: Models of horizontal FDI
  - Heterogeneous firms — more productive firms become MNEs
  - The proximity-concentration tradeoff
- Present: Export platform FDI
  - So far, an affiliate in country j serves only country j
  - Fact #5: not all affiliate sales go to host country
  - Let an affiliate in country j serve foreign country k, too
- Future: Vertical FDI
  - Will start models of vertical FDI after the exam
  - Produce in other countries to save factor costs

Volvo’s investment in South Carolina

Volvo's investment in South Carolina

- $1 billion assembly plant (4,000 workers)
- Produce S60 sedans and a second line TBD
- Plan to build 60,000 cars per year
- 60 percent of cars for export

- Why South Carolina?
  - Geography
  - Weak unions (lower costs)
  - Incentives: $2.5 mil. for water line, $1 mil. for road, tax breaks...

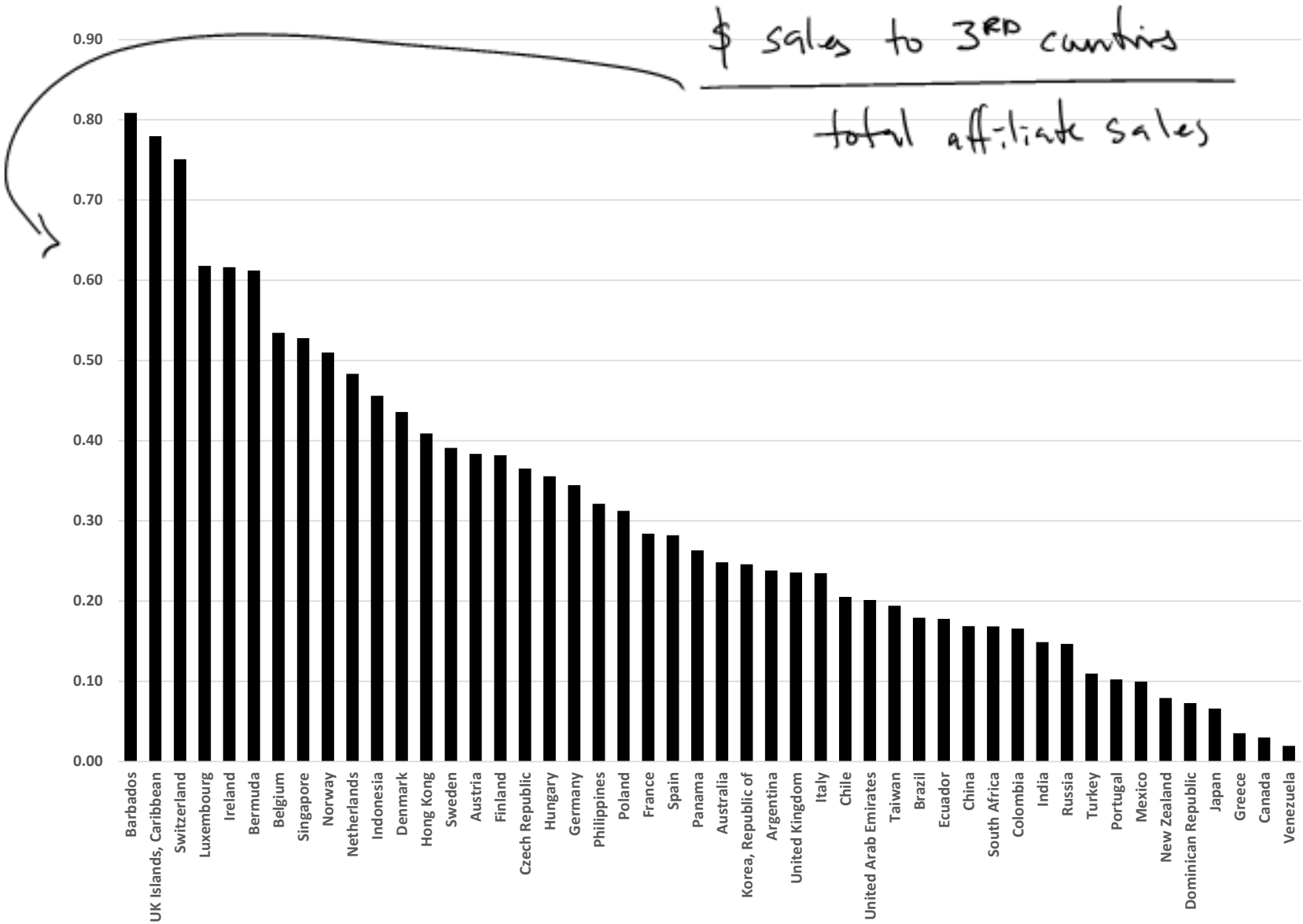

US.
Home
HQs
MX
Host
Foreign affiliate
ARG
BRAZIL
BRS country

Fact #5: What markets do affiliates serve?

- As a share of the total affiliate sales

	Host country	Other foreign	United States
Total manufacturing	55	34	11
Textile and apparel	45	35	19
Metals and minerals	60	32	8
Chemicals and plastics	58	36	6
Machinery	49	36	15
Computers and electronics	40	43	16
Electronic equipment	47	40	13
Transport equipment	47	35	19
Other	66	26	8

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)

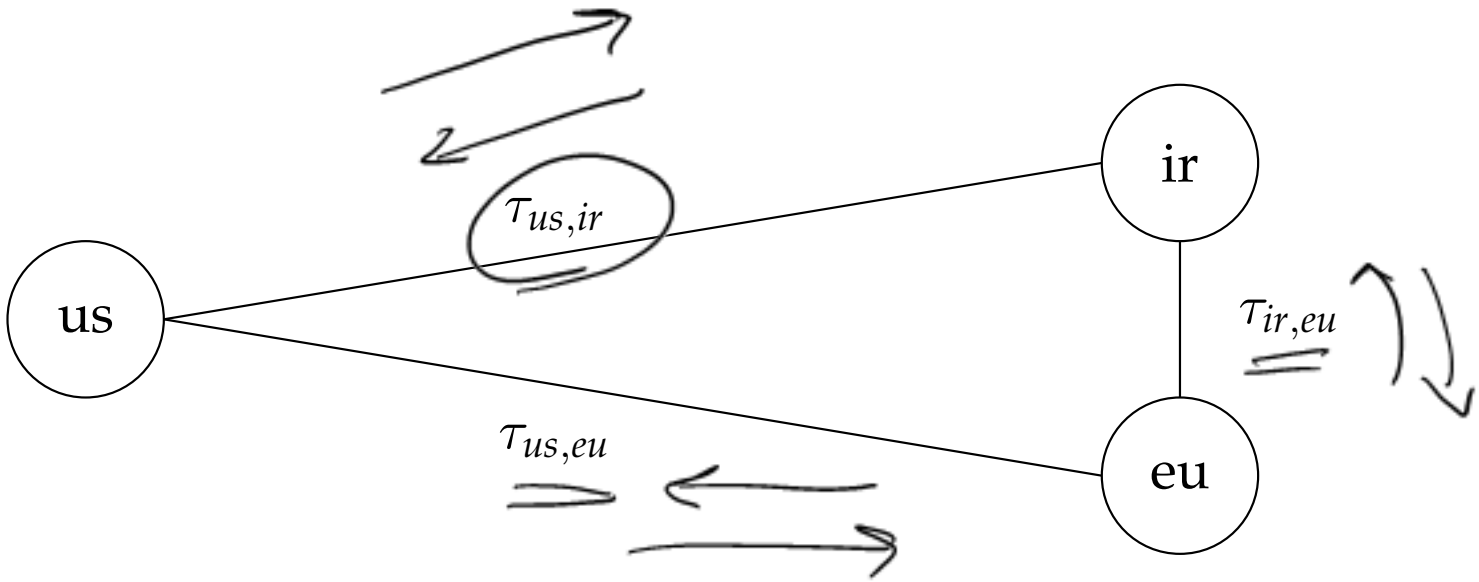
Export platforms in the model

- 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

$\tau_{us,ir}, \tau_{us,eu} \gg 0$

$\tau_{ir,eu} \geq 0$ but small

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 2: $w_{ir} < w_{eu}$
  - 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

XP profit

MNE PROFIT

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

> 0

BE AN XP.

Optimal configuration

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

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

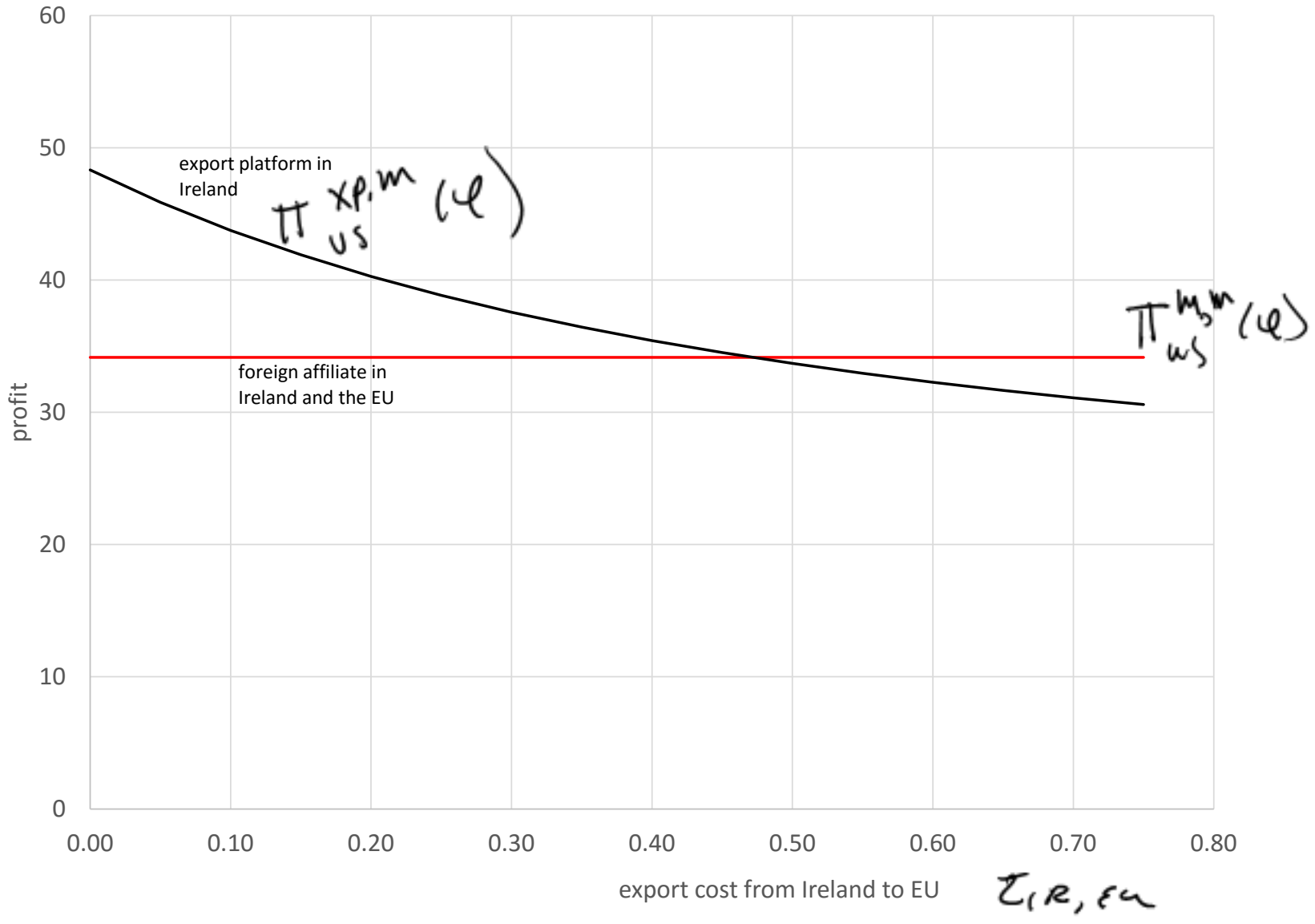
$$\left(\frac{w_{ir}}{\varphi} (1+\tau_{ir,eu}) \right)^{1-\epsilon_{eu}} - \left(\frac{w_{eu}}{\varphi} \right)^{1-\epsilon_{eu}} = \frac{1}{\left(\frac{w_{ir}}{\varphi} (1+\tau_{ir,eu}) \right)^{\epsilon_{eu}-1}} - \frac{1}{\left(\frac{w_{eu}}{\varphi} \right)^{\epsilon_{eu}-1}}$$

Optimal configuration

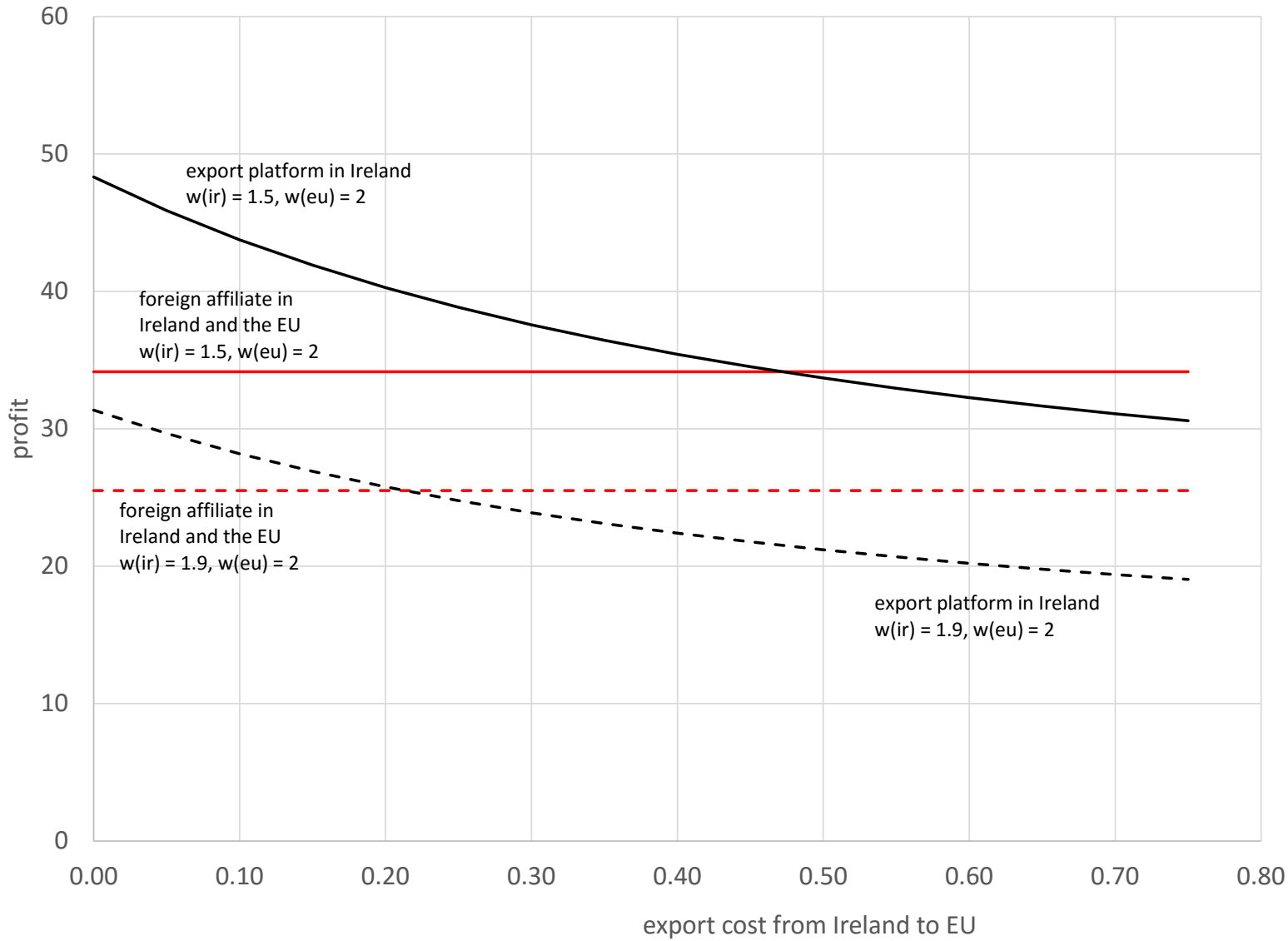
$$\left(\frac{w_{ir}}{\varphi}(1+\tau_{ir,eu})\right)^{1-\epsilon_{eu}} - \left(\frac{w_{eu}}{\varphi}\right)^{1-\epsilon_{eu}} = \frac{1}{\left(\frac{w_{ir}}{\varphi}(1+\tau_{ir,eu})\right)^{\epsilon_{eu}-1}} - \frac{1}{\left(\frac{w_{eu}}{\varphi}\right)^{\epsilon_{eu}-1}}$$

- 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 ($w_{ir} << w_{eu}$), more likely to be export platform

Profit


60
50
40
30
20
10
0
profit
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
export cost from Ireland to EU
export platform in Ireland
foreign affiliate in Ireland and the EU

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