

# Multinationals and the Globalization of Production

## *Competing for FDI*

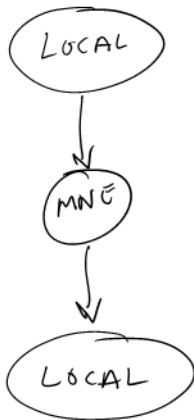
Penn State // Fall 2017

## Administrative things

- ▶ Sign in to Arkaive.com (course code: 84ST)
  - ▶ If not working, sign in up front
- ▶ Problem set #4
  - ▶ Due end of class, Thursday 11/2
- ▶ General Motors mini-case
  - ▶ Thursday, in class
  - ▶ Readings posted online, questions posted later today
- ▶ Exam #2
  - ▶ Thursday, 11/9
  - ▶ Covers material from 10/10–11/7
  - ▶ Same format as exam #1

## Roadmap

- ▶ Past: Motives for firms to produce abroad
  - ▶ Horizontal reasons (market access)
  - ▶ Vertical reasons (factor cost differences)
  - ▶ Some mixture of the two
  - ▶ Focused on the firm
  
- ▶ Currently: The impact of FDI on the host country
  - ▶ Host country productivity effects of MNEs ✓
  - ▶ Factor market effects ✓
  - ▶ Competition effects ✓
  - ▶ Should governments encourage inward FDI?



\* BACKWARD LINKS \*

## FDI promotion policies

- ▶ Individual subsidies
- ▶ Harder to find details, but they exist everywhere
- ▶ GM in Brazil: \$1.5 billion over 15 years → Subsidies to build roads and ports; VAT exemption; import duty exemption
- ▶ BMW in N. Carolina: \$150 million → Employment training program; manage recruiting and screening of employees; modernize airport
- ▶ Foxconn in Wisconsin: \$10 billion
  
- ▶ Domestic large firms often get these too...

## Should governments promote FDI?

- ▶ Econ 102: Are there market failures?
  - ▶ No? Do not subsidize.
  - ▶ Yes? Maybe. Becomes a quantitative question.
- ▶ MNE market failures
  - ▶ Spillovers to upstream and downstream firms
  - ▶ Some evidence of spillovers...
  - ▶ Case-by-case evaluations needed

## Should governments promote FDI?

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- ▶ Econ 102: Are there market failures?
  - ▶ No? Do not subsidize.
  - ▶ Yes? Maybe. Becomes a quantitative question.
- ▶ MNE market failures
  - ▶ Spillovers to upstream and downstream firms
  - ▶ Some evidence of spillovers...
  - ▶ Case-by-case evaluations needed
- ▶ Even if there are uncaptured benefits, competing for FDI can be problematic
- ▶ A simple model illustrates the point

## A model of FDI competition

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- ▶ Countries  $i = 1, \dots, N$
- ▶ One multinational, with a project
  - ▶ Project has profit  $\pi_i = v_i - f_i^p$
- ▶ If project is located in  $i$ , country benefit is  $b_i$ 
  - ▶  $b_i$  captures the spillovers from project
  - ▶ Spillovers spread across many small households and firms
- ▶ Country can offer a take-it-or-leave-it subsidy,  $s_i$ 
  - ▶ Small household and firm assumption creates free rider problem
  - ▶ Government makes subsidy offer on their behalf

local  
v

## Assumptions

1. There is only one country competing for the project
2. The project is not privately beneficial to the firm

$$\pi_i = v_i - f_i^p < 0$$

3. The project is jointly beneficial

$$\underline{\underline{\pi + b_i = v_i - f_i^p + b_i > 0}}$$



## The government's problem

- ▶ Government makes a take-it-or-leave-it offer (bargaining power?)
- ▶ Chooses  $s_i$  to maximize the after-subsidy benefit, subject to incentivizing the multinational to build the project in  $i$

$$\max_{s_i} \beta_i = b_i - s_i$$

$$\text{subject to } \underbrace{v_i - f_i^p}_{< 0} + s_i \geq 0$$

↑  
participation  
constraint

Solution:

$$s_i = f_i^p - v_i + \eta$$

## The equilibrium

- ▶ The optimal subsidy is  $s_i = f_i^p - v_i + \eta$
- ▶  $\eta$  is a very small positive number — just enough to make the project profitable for the multinational
- ▶ The multinational's profit is  $\pi_i + s_i = \underbrace{v_i - f_i^p}_{\pi_i} + \overbrace{f_i^p - v_i + \eta}^{s_i} = \eta$
- ▶ The country's after-subsidy benefit is  $\beta_i = b_i - \underbrace{(f_i^p + v_i)}_{s_i} - \eta = b_i + \pi_i - \eta$
- ▶ The country extracts all but  $\eta$  of the joint surplus
- ▶ The country has all the bargaining power "take it or leave it"
- ▶ Subsidies seem like a good idea, yeah?

## A two-country model

- ▶ Same model as before, but two countries  $i = 1, 2$
- ▶ For simplicity, make the two countries identical
  - ▶  $v_1 = v_2 = v, f_1^p = f_2^p = f^p$ , and  $b_1 = b_2 = b$
- ▶ Timing
  1. Countries submit “sealed bid” subsidies
  2. Firm chooses country that maximizes profit. If a tie, firm randomizes.

## Country 1 payoffs

1. Country 2 no subsidy and country 1 no subsidy:  $\beta_1 = 0$  No project
2. Country 2 no subsidy and country 1 yes subsidy:  $\beta_1 = b + \pi - \eta$  Project in 1
3. Country 2 yes subsidy and country 1 no subsidy:  $\beta_1 = 0$  Project in 2
4. Country 2 yes subsidy and country 1 yes subsidy:

$$E(\beta_1) = \frac{1}{2}(\beta_1 = 0) + \frac{1}{2}(\beta_1 = b - b = 0) = 0$$

$$\begin{array}{l} S_1 = b \\ \beta_1 = 0 \end{array} \quad \begin{array}{l} S_2 = b \\ \beta_2 = 0 \end{array}$$

- Why does country 1 give away its surplus?

BERTRAND COMPETITION

## The payoff matrix

$$\left. \begin{aligned} \beta_1 &= 0 \\ \beta_2 &= 0 \end{aligned} \right\}$$

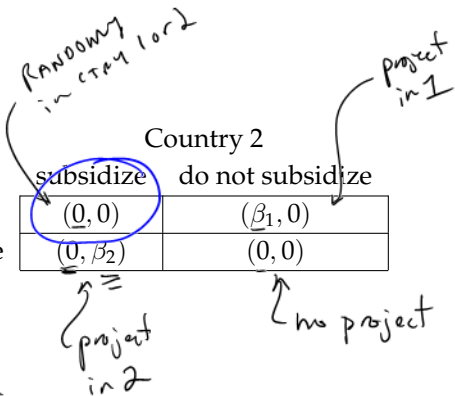
$$\pi + s = v - f + b = \pi + b$$

Country 1

subsidize  
do not subsidize

		Country 2	
		subsidize	do not subsidize
Country 1	subsidize	(0, 0)	( $\beta_1$ , 0)
	do not subsidize	(0, $\beta_2$ )	(0, 0)

► What is the Nash equilibrium?



## DOMINANT STRATEGY EQM

CTY 1

if 2 subs: subs or not subs →

if 2 no subs: subs

dominant strat.  
to subsidize

CTY 2

if 1 subs: subs or not subs →

if 1 nosubs: subs

dom. strat  
to subs.

## Asymmetric countries

- ▶ The payoff to the firm is identical in each country, but the benefit to each country is different:  $b_1 = 20, b_2 = 35, v = 100, f^p = 105, \eta = 0.01$
- ▶ If only country 1 competes, what are  $s_1, \beta_1$ , and  $\pi$ ?

$$s_1 = f^p - v + \eta = 105 - 100 + 0.01 = 5.01$$

$$\pi = v - f^p + s_1 = 100 - 105 + 5.01 = 0.01$$

$$\beta_1 = b_1 - s_1 = 20 - 5.01 = 14.99$$

$$\text{Joint surplus} = \pi + b_1 = 100 - 105 + 20 = 15$$

## In-class problem: Asymmetric countries

- ▶ The payoff to the firm is identical in each country, but the benefit to each country is different:  $b_1 = 20, b_2 = 35, v = 100, f^p = 105, \eta = 0.01$

- ▶ If only country 2 competes, what are  $s_2, \beta_2,$  and  $\pi$ ? Joint Surplus.

$$\text{Joint surplus} = \pi + b_2 = 100 - 105 + 35 = 30$$

$$s_2 = f^p - v + \eta = 105 - 100 + 0.01 = 5.01$$

$$\pi = v - f^p + s_2 = 100 - 105 + 5.01 = 0.01$$

$$\beta_2 = b_2 - s_2 = 35 - 5.01 = 29.99$$

1. Govt only bidder  $\rightarrow$  extracted all the joint surplus  
identical
2. Two<sup>v</sup> country  $\rightarrow$  "BERTRAND Comp"  
MNE extracts all joint surplus
3. Two non-identical countries  
 $\rightarrow$  high-value country gets project, and gives up surplus = benefit in other country.  
"BERTRAND"

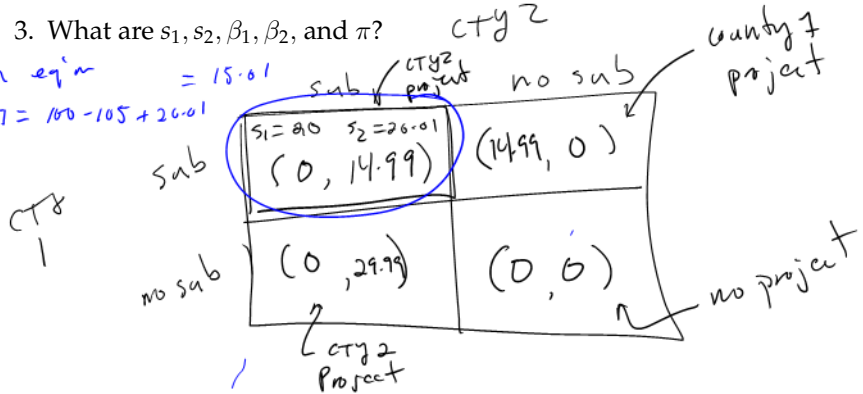


# In-class problem: Asymmetric countries

► The payoff to the firm is identical in each country, but the benefit to each country is different:  $b_1 = 20, b_2 = 35, v = 100, f^p = 105, \eta = 0.01$

1. Now both countries compete. Write out the payoff matrix.
2. Where is the project located?
3. What are  $s_1, s_2, \beta_1, \beta_2$ , and  $\pi$ ?

In eq'n  
 $\pi = 100 - 105 + 20 \cdot 0.1 = 15.01$



## Policy coordination

- ▶ Competition transfers surplus to the MNE
- ▶ Suppose the two countries could coordinate
  - ▶ Agree that only one country makes the subsidy offer
  - ▶ The subsidizing country makes a transfer ( $T$ ) to the other country
- ▶ Continuing the previous example
  - ▶ Which country makes the subsidy offer? *country 2*
  - ▶ How big is the subsidy? *"single-country"  $s_2 = 5.01$*
  - ▶ How big is the Transfer?

$$T = 0.01 \text{ to city 1}$$
$$p_2 = 29.99 - 0.01 = 29.98$$

*Apple in Ireland } → EU competition committee*  
*Amazon in UK }*

## Competing for FDI

- ▶ FDI competition makes both countries worse off
- ▶ FDI competition makes multinational happy...
- ▶ Solution: policy coordination & rules about subsidies
  - ▶ Uniform policies within EU

## Summary

- ▶ Countries compete for FDI
  - ▶ Tax breaks
  - ▶ Direct subsidies
  - ▶ Often with strings attached
- ▶ Subsidies only a good idea if market failures
  - ▶ How big are spillovers?
- ▶ Subsidy competition transfers surplus to the MNE