

# Multinationals and the Globalization of Production

*FDI and the host country*

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
  - ▶ Available on course website tomorrow
- ▶ 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
  
- ▶ Up next: The impact of FDI on the host country
  - ▶ How are local firms affected?
  - ▶ Should governments encourage inward FDI?
  
- ▶ Today: Focus on productivity in host country

## Productivity

- ▶ How well a firm changes inputs into outputs
- ▶ More productive firms produce more output per unit of inputs
  
- ▶ Why do we care about productivity?
  - ▶ High productivity generates “rich” countries
  - ▶ The Solow growth model shows us this
  
- ▶ MNEs are big and productive
  
- ▶ How do they affect productivity in the host country?

## Measuring productivity

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- ▶ Cobb-Douglas production function for plant  $i$

$$y_i = \varphi_i k_i^\alpha \ell_i^{1-\alpha}$$

- ▶  $y$  = output;  $k$  = physical capital;  $\ell$  = labor;  $\alpha$  = parameter
- ▶  $\varphi$  = total factor productivity (TFP)
- ▶ With data on  $y$ ,  $k$ ,  $\ell$ , and  $\alpha$ , compute productivity

$$\varphi_i = \frac{y_i}{k_i^\alpha \ell_i^{1-\alpha}}$$

[In our model: no capital,  $\alpha = 0$ ]

## Productivity

- ▶ Total factor productivity best (not perfect) measure
  - ▶ Capital can be difficult to measure
- ▶ Other measures [easier to find data]
  - ▶ Real value added per worker
  - ▶ Real sales per worker

## Average productivity

- ▶ How productive is a country?
- ▶ How productive is an industry?
- ▶ Often asked by policy makers:
  - ▶ How will policy X affect productivity in my country/industry?
- ▶ These are statements about the average productivity in a country/industry
  
- ▶ How do we measure average productivity?

## Computing average productivity

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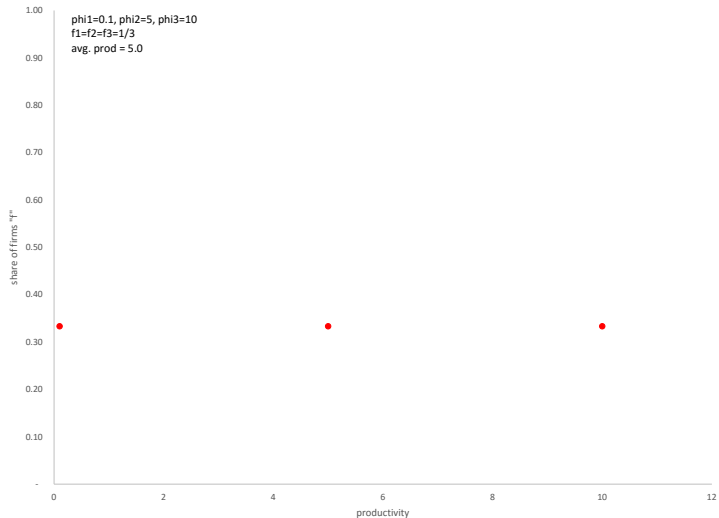
- ▶ Suppose we have three types of firms
  - ▶ High productivity, medium productivity, low productivity
  - ▶  $\varphi_3 > \varphi_2 > \varphi_1$
- ▶ Distribution over the three types
  - ▶  $f_3$  = share of all firms of type 3
  - ▶  $f_2$  = share of all firms of type 2
  - ▶  $f_1$  = share of all firms of type 1
  - ▶  $f_1 + f_2 + f_3 = 1$
- ▶ Average productivity

$$\varphi_{avg} = f_1\varphi_1 + f_2\varphi_2 + f_3\varphi_3$$



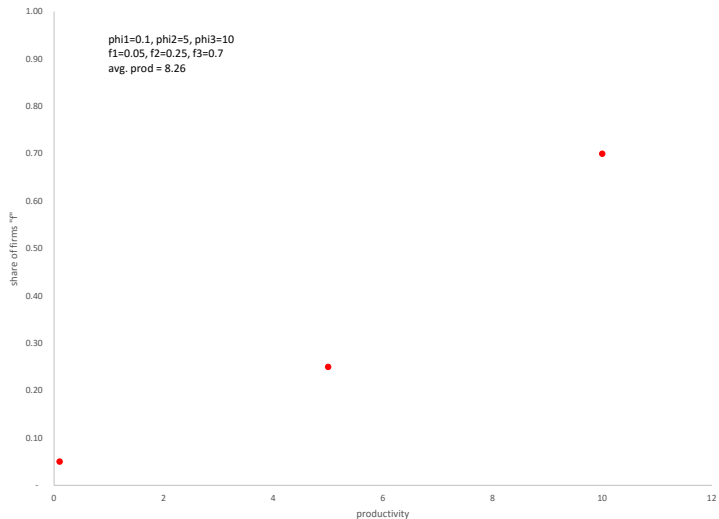
# Uniform distribution

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# Fewer low-productivity firms

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## Two kinds of productivity effects

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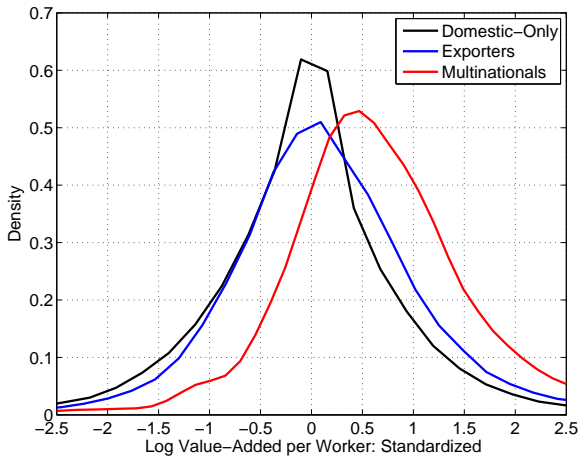
1. Composition effects (changes in  $f$ )

2. Spillover effects (changes in  $\varphi$ )

# Composition effects

# US manufacturing productivity

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Source: Flaaen (2014)

## Multinational premium

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► MNE premium =  $\text{avg}(x_{mne}) / \text{avg}(x_{dom})$

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Country	MNE premium	Source
Chile	15% (va/worker)	Ramondo (2009)
Morocco	20% (ouput/worker)	Haddad and Harison (1993)
U.K.	6–22% (va/worker)	Griffith (2009)
		Girma, Greenaway, and Wakelin (2001)
U.S.	94% (va/worker)	Doms and Jensen (1998)
U.S.	50% (va/worker)	Flaen (2015)

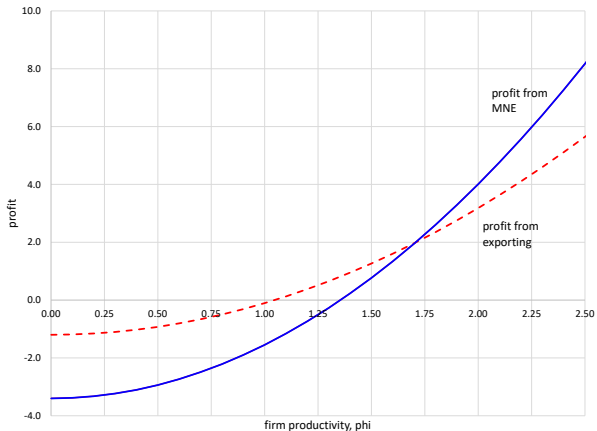
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## MNEs are more productive

- ▶ Productivity distribution for MNEs to the “right” of domestic firms
- ▶ There are a greater number of more-productive MNEs
- ▶ Our heterogenous firm model generates this pattern

## Profits and productivity

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► Which firms export? Which firms become MNEs?



## Increasing MNEs in a country

- ▶ Increases share of firms with high productivity
- ▶ Increases competition for local firms
  - ▶ Least efficient firms close
  - ▶ Decrease share of firms with low productivity
- ▶ These effects increase average productivity in the country

## Two kinds of productivity effects

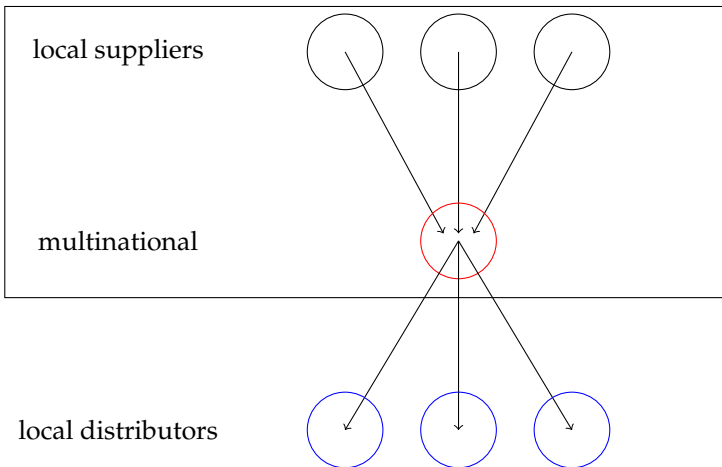
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1. Composition effects (changes in  $f$ )
  - ▶ MNEs more productive than local firms
  - ▶ Increase competition
  - ▶ Change in types of firms in production
  - ▶ Aggregate productivity increases
2. Spillover effects (changes in  $\varphi$ )

# Spillover effects

## MNE interactions with other firms: flow of goods

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## Spillovers through backward linkages

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- ▶ *Backward link*: Changes in upstream firms from MNE interactions
  - ▶ Change inventory methods
  - ▶ Improve quality for use in MNE
  - ▶ Provide technology or training to upstream firms
- ▶ Could be formal or informal
  - ▶ Formal: License a technology to upstream firm
  - ▶ Informal: Demonstrate new techniques, employment turnover
- ▶ More important when more MNE inputs are from locals

## What benefits do MNEs provide?

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► Interviews with local Czech firms (25 companies reporting)

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	firms reporting assistance	of which required fee
advance payment & financing	14	2
leasing/lending machinery	7	2
employee training	7	1
quality control	5	1
business strategy	5	0
supplying inputs	2	1
production technology	3	1
organization of production lines	3	1
finding export markets	3	1
license for new technology	2	1
financial planning	2	0
machinery maintenance	2	1
inventory management	1	0

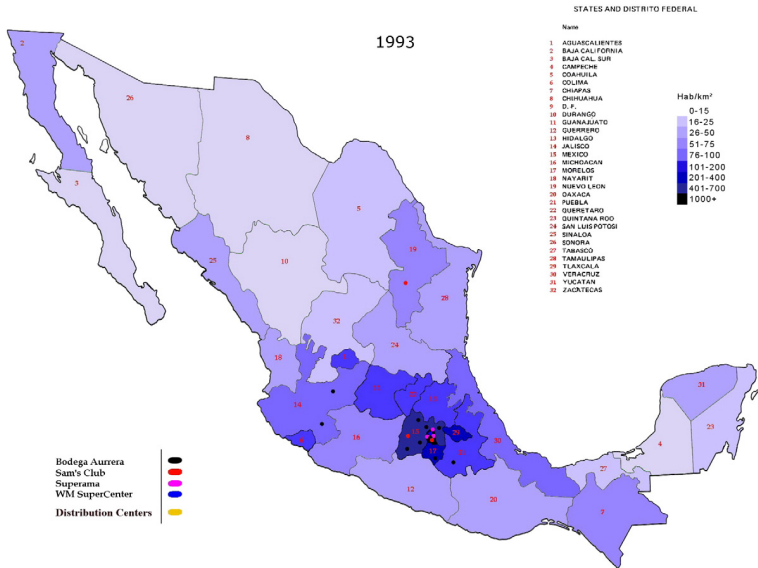
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Source: Javorcik and Spatareanu (2009)

## Walmex (Walmart de México)

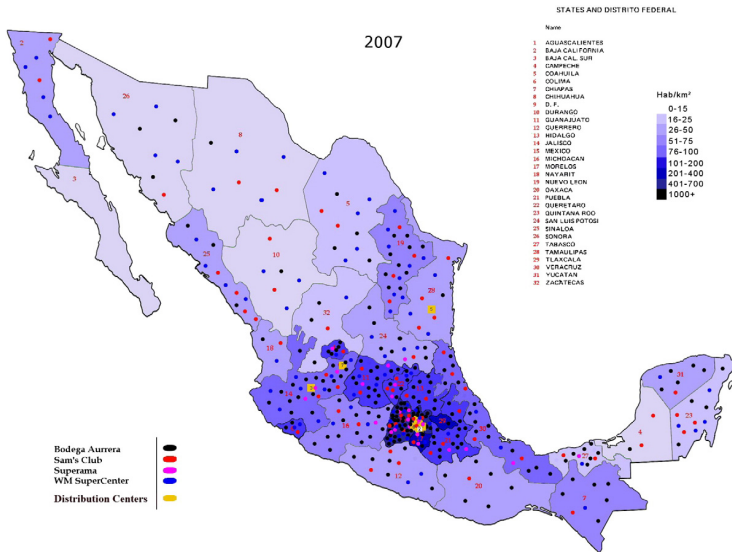
- ▶ 1991: Walmart enters Mexico through joint venture
- ▶ 1997: Walmart become majority owner
- ▶ 2001: Walmex accounts for half of Mexican retail

# Walmex locations 1993





# Walmex locations 2007



Source: Iacovone et al. (2015)

## Walmex (Walmart de México)

- ▶ 1991: Walmart enters Mexico through joint venture
- ▶ 1997: Walmart become majority owner
- ▶ 2001: Walmex accounts for half of Mexican retail
- ▶ Walmex introduces new technology to Mexico
  - ▶ Improvements in warehousing, distribution
  - ▶ 2007: Walmex only retailer using computerized sales and inventory tracking
  
- ▶ What is the impact on Mexican suppliers?
- ▶ Iacovone et al. (2015) interviews suppliers

## Walmex and backwards linkages

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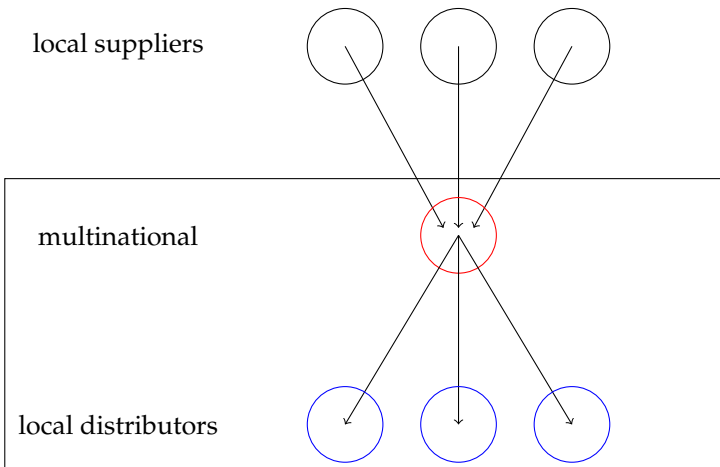
- ▶ Advantages to supplying Walmex
  - ▶ Access to a large market
  - ▶ Walmex pays on time (decrease uncertainty)
  - ▶ Low distribution costs
- ▶ Disadvantages to supplying Walmex
  - ▶ Walmex has large bargaining power
  - ▶ Must make investments in technology to meet Walmex requirements (e.g. packaging technology)
  - ▶ Reduces prices as goods become less popular

## Walmex and suppliers

- ▶ How did suppliers respond?
  - ▶ High cost suppliers do not get Walmex distribution; face stiffer competition; some fail
  - ▶ More efficient suppliers get larger market share through Walmex, but must keep up with Walmex price pressure
  - ▶ Increased incentive to innovate both products (new or better kinds of goods) and process (new or better ways of producing)
- ▶ Firms upstream from Walmex improve → backward linkage spillover
- ▶ Retailing and distribution in Mexico are more efficient

## MNE interactions with other firms: flow of goods

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## Spillovers through forward linkages

- ▶ Forward link: Changes in downstream firms from MNE
  - ▶ Create and expand local distributors
  - ▶ Provide better inputs for downstream producers
- ▶ Could be formal or informal
- ▶ More important when MNE sells more in domestic market
  
- ▶ Almost no evidence that forward linkages are important

## Evidence of spillovers in Lithuania

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- ▶ Javorcik (2004): Study firm-level data in Lithuania
- ▶ Increase in MNE activity as Lithuania transitions to market economy
- ▶ Look for upstream and downstream spillovers
- ▶ Backward linkage spillovers
  - ▶ Do firms that produce goods used in industries with “many” MNEs have higher productivity?
- ▶ Forward linkage spillovers
  - ▶ Do firms that use goods produced in industries with “many” MNEs have higher productivity?

## Evidence of spillovers in Lithuania

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- ▶ Find evidence of backward spillovers
- ▶ Find no evidence of forward spillovers
  - ▶ Developing countries more export oriented
- ▶ Backward spillovers are stronger in joint-ventures compared to “greenfield investment”
  - ▶ Local partner in joint venture has easier time finding local suppliers [selection vs. spillovers]



## Two kinds of productivity effects

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### 1. Composition effects (changes in $f$ )

- ▶ MNEs more productive than local firms
- ▶ Increase competition
- ▶ Change in types of firms in production
- ▶ Aggregate productivity increases

### 2. Spillover effects (changes in $\varphi$ )

- ▶ MNEs make local firms more productive
- ▶ Backward linkages with local input suppliers
- ▶ Forward linkages with local distributors

## MNEs and host country productivity

- ▶ How does FDI affect the average productivity of the host country?
- ▶ Two channels: composition and spillovers
  - ▶ Composition: More high-productivity firms
  - ▶ Spillovers: Local firms become more productive
- ▶ Composition effects predicted by heterogenous firm models
- ▶ Spillovers
  - ▶ Backward linkages to local suppliers
  - ▶ Forward linkages to local distributors
- ▶ Backward linkages strong, forward linkages weak