

# Selection and Market Reallocation: Productivity Gains from Multinational Production

Laura Alfaro

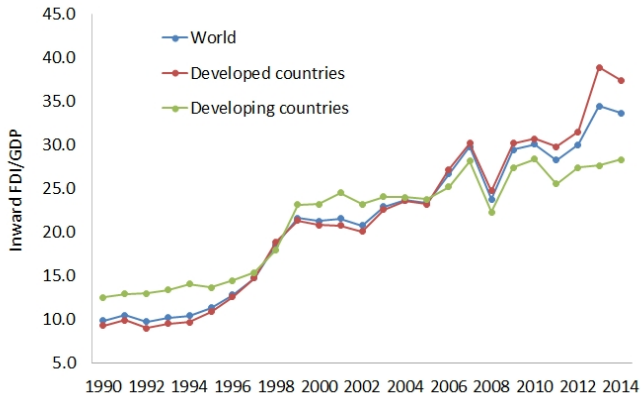
Harvard Business School and NBER

Maggie Xiaoyang Chen

George Washington University

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# Stylized Fact 1: FDI grew dramatically in past decades.

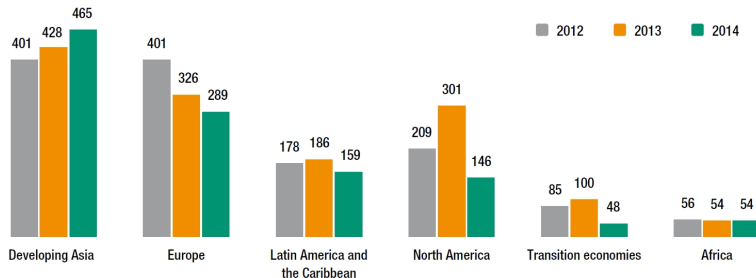


# Stylized Fact 1: FDI grew dramatically in past decades.

A region witnessing steady growth in FDI inflows is developing countries in Asia.

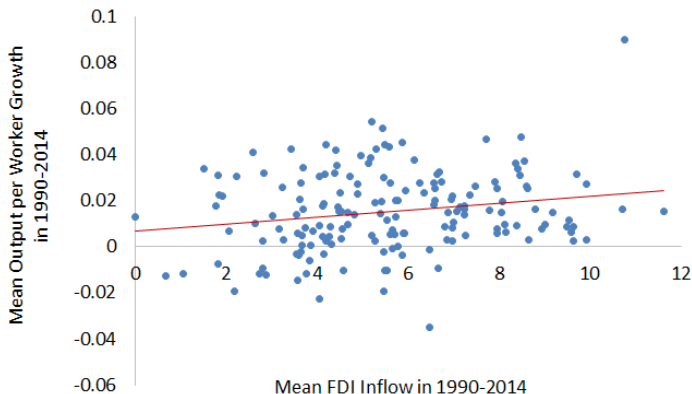
Figure I.2.

FDI inflows, by region, 2012–2014 (Billions of dollars)



Source: UNCTAD, FDI/MNE database ([www.unctad.org/fdistatistics](http://www.unctad.org/fdistatistics)).

## Stylized Fact 2: Nations with greater FDI exhibit, on average, higher productivity growth.



## Stylized Fact 3: Most nations offer FDI promotion policies.

	Share of countries
Any incentives	76%
Reduced tax rates	55%
Tax holidays	51%
Financial incentives (grants/loans)	31%
Subsidized infrastructure or services	23%
Regulatory concessions (exemptions from labor or environmental laws)	11%

Source: World Bank Census of Investment Promotion Agencies

## **First, are there productivity gains from FDI?**

- Macro-level evidence suggests that FDI could exert a positive effect on economic growth when host countries have sufficient human capital stock and relatively developed financial markets.
- However, causality is always an empirical concern and difficult to tackle at the country level.

**Next what are the mechanisms of productivity gains?**

**Two channels have been emphasized in the literature:**

- 1** Multinationals are more productive than domestic firms (Helpman, Melitz and Yeaple, 2004; Yeaple, 2009; Chen and Moore, 2010)
- 2** Productivity spillover from multinationals to domestic firms:  
Knowledge spillover, technology transfer, backward and forward production linkages (Aitken and Harrison, 1999; Javorcik, 2004 and many other words, Keller and Yeaple, 2009; Guadalupe et al., 2012; Fernandes and Paunov, 2012; Carluccio and Fally, 2013; ...).

**There are, however, two less stressed, alternative channels:**

- 1** Self upgrading: The threat of FDI motivates domestic firms to innovate, adjust product composition, and upgrade productivity (Bao and Chen, 2016).
- 2** Selection and market reallocation: FDI leads to tougher competition and market reallocation and allows only the most productive domestic firms to survive.



# Productivity Gains from FDI: Policies

- All the above mechanisms imply a positive relationship between FDI and aggregate host-country productivity, but they convey very different policy implications. In particular,
  - Productivity spillover is a positive externality from FDI and could justify FDI promotion policies and special incentives;
  - Market reallocation leads to a reallocation of output and resources from domestic to foreign multinational firms and calls for complementary policies to address the consequences of output and factor reallocations.

- We investigate the productivity gains from FDI including:
  - the aggregate impact;
  - the relative importances of two main mechanisms: (i) within-firm productivity improvement; and (ii) between-firm selection and market reallocation.

- We use a cross-country firm-level panel dataset, drawn from Orbis, that contains comprehensive financial, operation, and ownership information for over 1 million manufacturing firms in over 30 countries.
- Orbis provides several distinct advantages:
  - Ownership information, which covers over 30 million shareholder/subsidiary links and allows us to identify foreign owned and domestic firms;
  - Time-series financial information, which enables measuring firm total factor productivity over time;
  - Broad country coverage.

# Stage 1: Evaluating the Impact

- Step 1: Accounting for the endogenous entry decisions of multinational firms which is estimated as a function of:
  - all time-variant country-pair industry factors
  - multinationals' ex-ante productivity
  - multinationals' financial shocks in headquarters countries (e.g., Froot and Stein, 1991; Baker, Foley, and Wurgler, 2008)
    - Multinationals with a positive financial shock in headquarters have reduced financial constraints in foreign investment especially in host countries with large entry costs.
    - But such idiosyncratic financial shocks, unlike other firm characteristics such as productivity, are unlikely to be directly correlated with the future productivity growth of host-country domestic firms, thereby offering an exclusion restriction.

# Stage 1: Evaluating the Impact

## ■ Step 2: The causal effect of FDI on aggregate productivity

Table 2: Multinational Entry and Change in Average Productivity (Country-Industry Level)

Dependent variable:	(1)	(2)
	Change in ave TFP	Change in ave TFP
MNC entry	0.01*** (0.004)	
MNC entry (predicted)		0.02** (0.01)
Beta coefficients	0.05	0.02
Host country FE	Yes	Yes
Industry FE	Yes	Yes
Obs	3,730	3,730
R square	0.52	0.52

Notes: (i) Columns (1) and (2) report OLS and instrumented estimates, respectively; (ii) bootstrapped standard errors are reported in the parentheses; (iii) \*\*\*, \*\*, and \* represent statistical significance at 1, 5, and 10 percent, respectively.

## Stage 2: Decomposing the Productivity Gains from FDI

- Weighted aggregate productivity  $\tilde{\theta}_t^w$ :

$$\tilde{\theta}_t^w = \sum_i s_{it} \theta_{it} = \underbrace{\bar{\theta}_t}_{\text{unweighted mean}} + \underbrace{\sum_i (s_{it} - \bar{s}_t)(\theta_{it} - \bar{\theta}_t)}_{\text{output-productivity covariance}} \quad (1)$$

- Comparing  $\tilde{\theta}_t^w$  in two periods yields:

$$\begin{aligned} \Delta \tilde{\theta}_t^w = & \underbrace{\left( \bar{\theta}_t^{\text{surviving}} - \bar{\theta}_{t-1}^{\text{surviving}} \right)}_{\text{within-firm}} + \underbrace{\left( \bar{\theta}_{t-1}^{\text{surviving}} - \bar{\theta}_{t-1}^{\text{all}} \right)}_{\text{selection}} \quad (2) \\ & + \underbrace{\Delta \sum_i (s_{it} - \bar{s}_t)(\theta_{it} - \bar{\theta}_t)}_{\text{reallocation}} \end{aligned}$$

## Stage 2: Decomposing the Productivity Gains from FDI

- Within-firm improvement: Greater FDI will shift the productivity distribution of surviving domestic firms rightward ( $\bar{\theta}_t^{surviving} > \bar{\theta}_{t-1}^{surviving}$ ).
- Selection: Greater FDI will raise the cutoff productivity and the cutoff revenue of domestic firms and force the least productive firms to exit ( $\bar{\theta}_{t-1}^{surviving} > \bar{\theta}_{t-1}^{all}$ ).
- Market reallocation: Greater FDI will shift the revenue distribution of domestic firms leftward, especially at the left tail of the productivity distribution ( $\Delta \sum_i (s_{it} - \bar{s}_t)(\theta_{it} - \bar{\theta}_t) > 0$ ).

## Stage 2: Within-firm Productivity Improvement

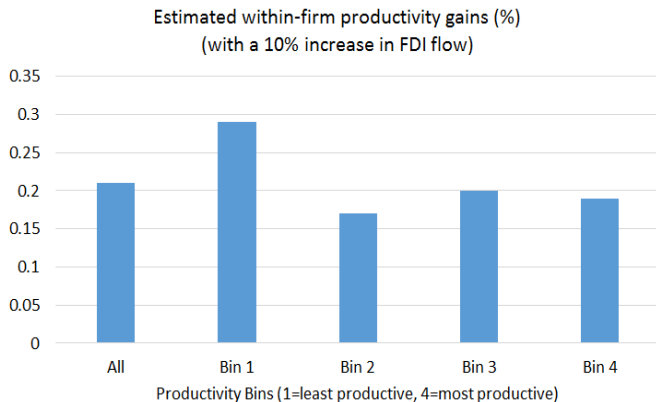
Table 3: The Shift of Domestic Productivity Distribution

Dependent var.:	(1)	(2)	(3)	(4)	(5)
Change in TFP	All	Bin 1 (<25%)	Bin 2 (25-50%)	Bin 3 (50-75%)	Bin 4 (>75%)
MNC entry (predicted)	0.021*** (0.001)	0.029*** (0.002)	0.017*** (0.001)	0.020*** (0.001)	0.019*** (0.002)
Host-country FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Obs	397,618	99,997	99,104	100,068	98,449
R square	0.05	0.06	0.07	0.06	0.06

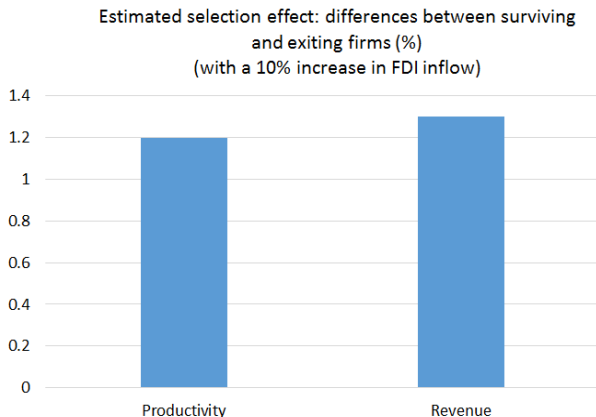
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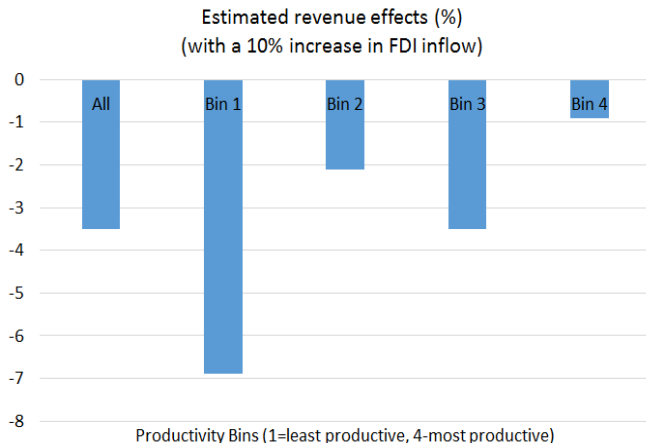
## Stage 2: Within-firm Productivity Improvement



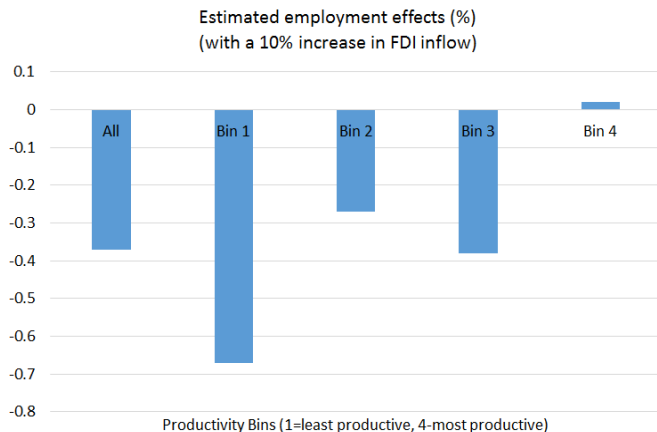
## Stage 2: Between-firm Selection



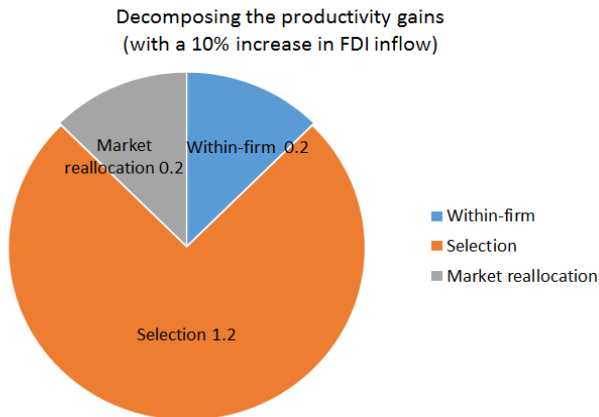
## Stage 2: Between-firm Market Reallocation



## Stage 2: Between-firm Market Reallocation



## Stage 2: Decomposing the Productivity Gains from FDI

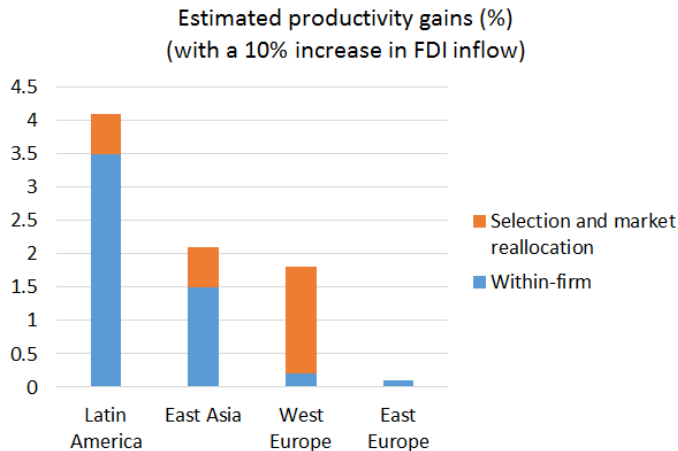


# Additional Productivity Gains

- Productivity spillover between industries through backward and forward production linkages
- Market reallocation between industries with greater labor and capital good mobilities

- Productivity measure
  - Other measures of productivity: Levinsohn and Petrin (2003), Akerberg, Caves, and Frazer (2006), and simple labor productivity,
  - Re-estimate the shift of productivity distribution for relatively homogeneous industries.
- Data coverage: consider only countries with best data coverage
- Controlling for the role of trade

## Stage 2: Decomposing the Productivity Gains from FDI across Regions





Three types of policy have been offered to foster FDI and spillover to local economies:

- 1 Policies to reduce FDI restrictions and attract FDI such as IPAs, tax holidays or cash incentives.
- 2 Policies improving the business environment including human capital or financial access to reduce the barriers that hinder both the ability of multinational affiliates to innovate and the capacity of local firms to absorb knowledge transfers.
- 3 Policies to strengthen the links between foreign-owned and domestic firms including minimum local content requirements and labor requirements.

However, policies to address the output and factor reallocation effects of FDI are also crucial, especially in industrial nations.

- 1 Policies to address the adjustment costs of labor and capital reallocation between firms and industries such as education and training programs and adjustment assistance;
- 2 Policies to encourage domestic firm innovation and improve domestic firm efficiency.