14.54 International Trade
— Lecture 24: Factor Mobility (II) —
Multinational Firms

Today's Plan

1. An Overview of Multinational Firms
2. What Determines the Organization of Multinationals?

1. An Overview of Multinational Firms

Multinational Firms and FDI: Definitions

- Multinational firm $\equiv$ Firm that operates plants in multiple countries
- In U.S. statistics, a U.S. company is considered multinational if it holds 10% or more of the stock of a foreign company
- Investment made in the Foreign country is referred to as Foreign Direct Investment (FDI)
- Company making the investment abroad is called a parent
- Company receiving the investment is called an affiliate

How Important are Multinational Firms in Practice?

- Multinational firms account for 25% of World GDP in 2011
- Multinational firms account for 1/3 of international trade in 2011 (from 2000 to 2011, around 50% of total U.S. imports were intrafirm)
- The 700 largest multinational firms account for roughly 50% of world R&D spending and close to 70% of world business R&D spending

How Important are Multinational Firms in Practice?

Table 1. Affiliates Relative to Local Firms

	Finland	France	Ireland	Holland	Poland	Sweden
Enterprises	1.6	2.0	13.4	3.4	16.0	2.8
Employment	17.2	26.2	48.0	25.1	28.1	32.4
Sales	16.2	31.8	81.1	41.1	45.2	39.9
R&D Expenditure	13.1	27.4	77.3	35.8	20.9	52.0
Exports	17.5	39.5	92.3	60.0	69.1	45.8

Source: OECD (2007).

Some Facts about Multinationals

1. FDI and affiliate activity have grown rapidly throughout the world, especially in late 1980s and late 1990s
2. The bulk of FDI flows between developed countries (in 2011, source of 82 percent of FDI flows and also recipients of 66 percent!)
3. Furthermore, large share of inflows into developing countries goes exclusively to Hong Kong, China and Korea
4. Two-way FDI flows are common between pairs of developed countries
5. Political risk and instability deter inward FDI

Some Facts about Multinationals

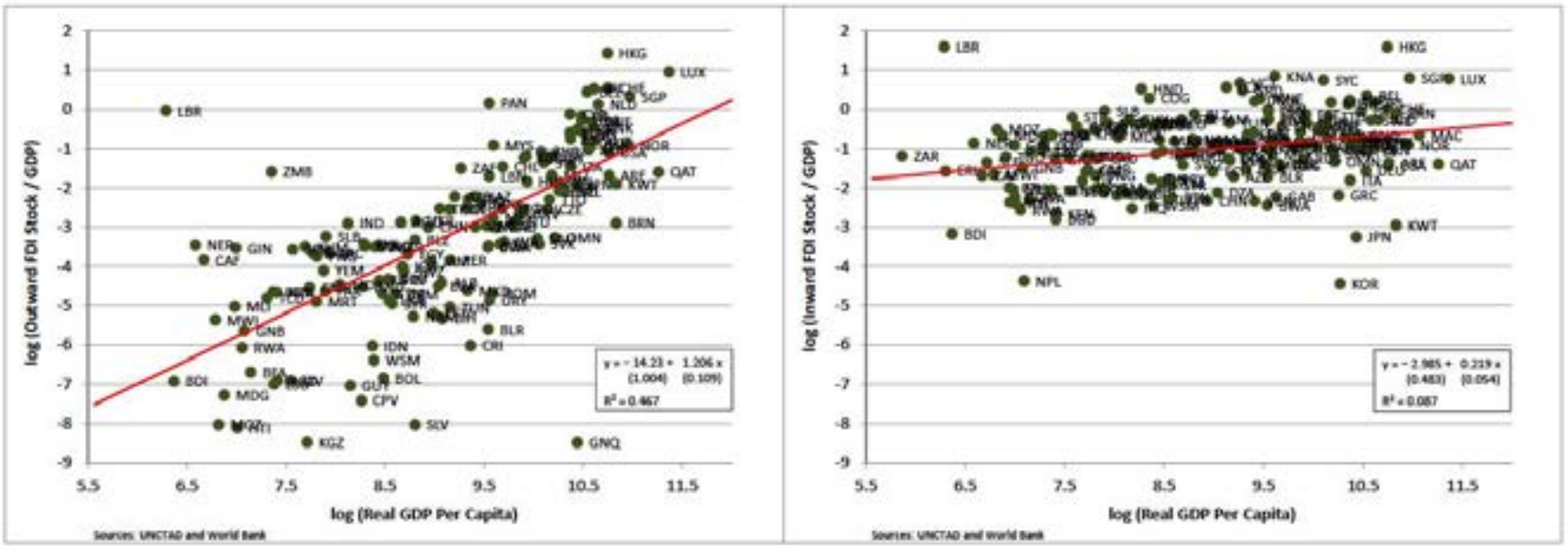


Figure 1: Aggregate FDI Stocks and Development

Courtesy of Pol Antràs and Stephen R. Yeaple. Used with permission.

Some Facts about Multinationals

- Southern multinationals are becoming more and more important:
  1. Lenovo buys IBM's PC division
  2. Mittal invests in Indonesia, E. Europe; buys Arcelor
  3. Tata buys Jaguar, Land Rover; Geely buys Volvo
  4. Chinese, Indian, Malasian oil companies in Africa
  5. Petrobras and Vale operate in many countries
- In 2005 Southern multinational FDI outflows $\equiv$ \$133 bn
  - 17% of world total \$779 bn

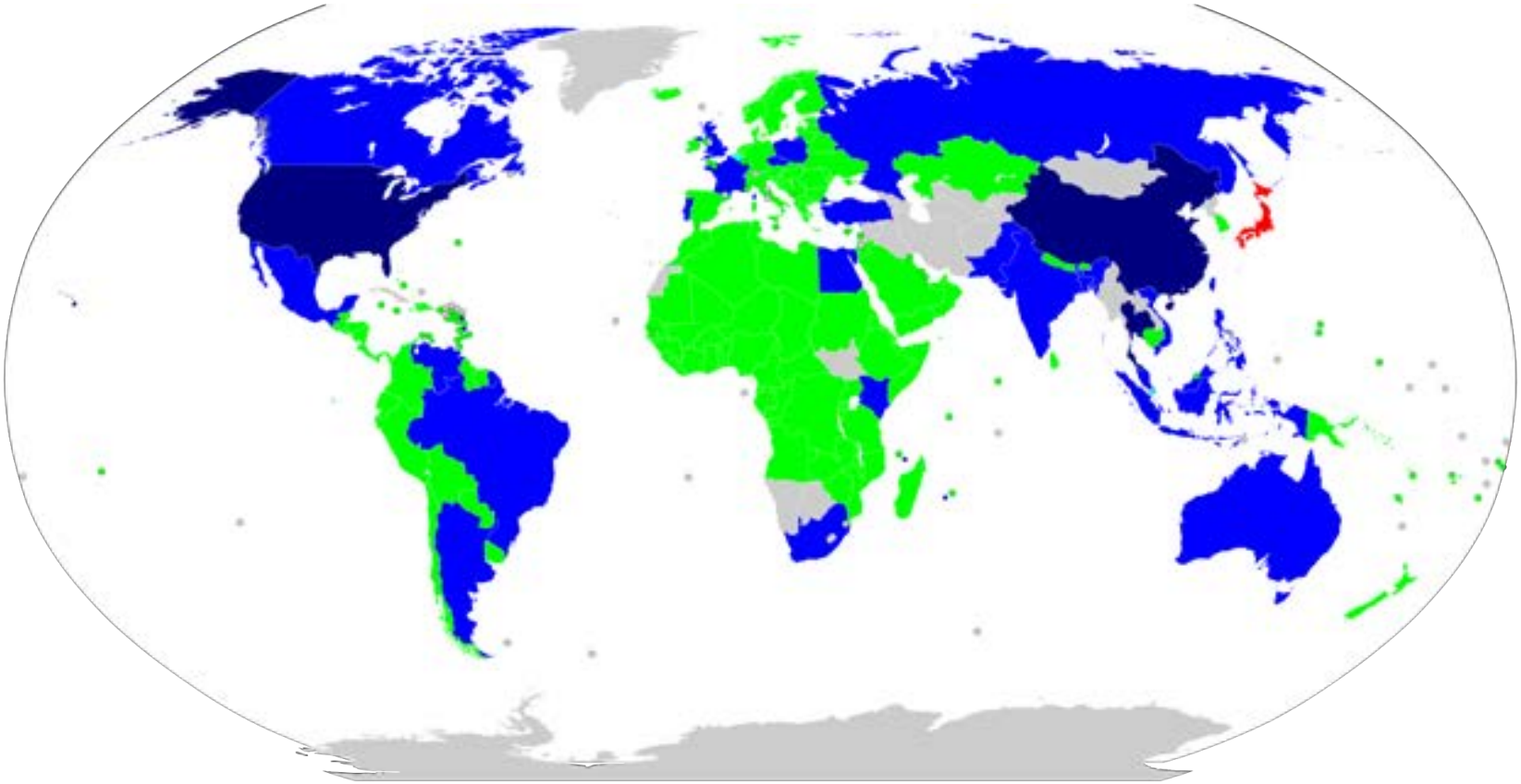
Example (I): Nestlé

View a graphic of all the companies connected to Nestle -

Example (I): Nestlé

- Nestlé is the world's biggest food and beverage company
- It is one of the "most international" firms in the world (very little sales in Switzerland)
- Nestlé decision to "go multinational" was motivated by export barriers, which forced Nestlé to set up factories throughout Europe
- By 1996, the Swiss-based company had factories in 74 of the 193 countries in the world

Example (II): Toyota

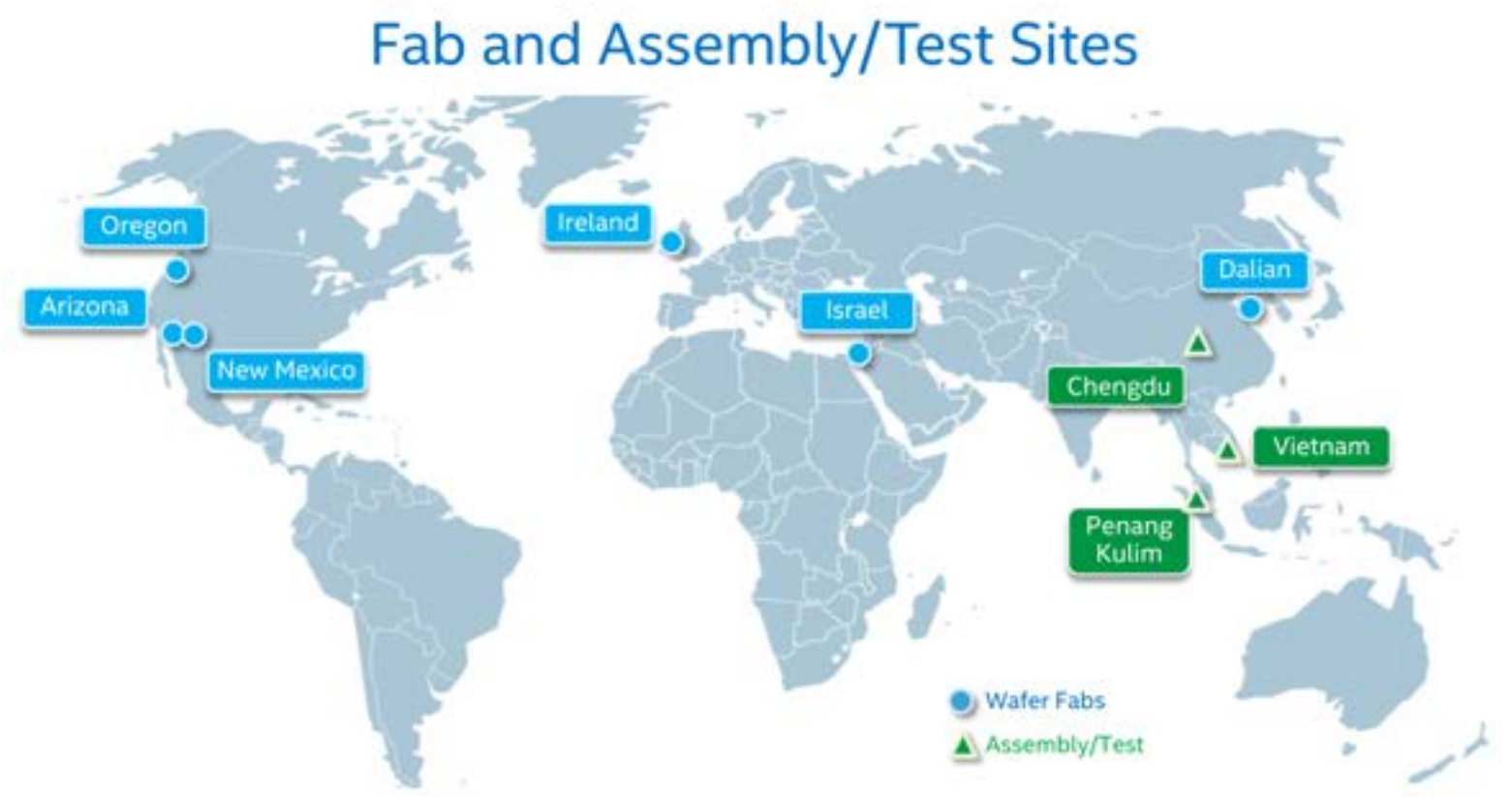


Courtesy of Manoj Prasad. License: CC-BY.

Example (II): Toyota

- Toyota Motor Corporation is one of the world's leading automakers
- Besides its own plants and 11 manufacturing subsidiaries and affiliates in Japan, Toyota has 51 manufacturing companies in 26 countries/locations
- Expansion explained by high weight-to-price ratio of motor vehicles and strict government policies that protect domestic markets and support local production
- More recently, some location decisions (Mexico, Turkey and Eastern Europe) seem to be based on cost considerations

Example (III): Intel



Example (III): Intel

- Intel Corporation is by far the largest chipmaker in the world
- Skill-intensive parts of the production process (wafer production and fabrication) in the United States (also Israel and Ireland)
- Labor-intensive parts (assembly and testing) to low wage countries
- Intel exerts substantial control over the different parts of the production process, keeping them "internalized"

Example (IV): Nike

Example (IV): Nike

- By 1998, Nike controlled over 40% of the $14.7 billion U.S. athletic footwear market
- Yet none of the millions of Nike"s pairs of athletic shoes sold in the U.S. were produced there
- And none of these pairs of shoes were produced in Nike-owned production facility
- Nike subcontracts 100% of its footwear production to independently owned and operated factories initially in South Korea and Taiwan, and then, China and Indonesia

2. What Determines the Organization of Multinationals?

What Determines the Organization of Multinationals?

- To understand the organization of multinationals, we need to explain:

1. **Location**: Why is a good produced in two countries rather than in one country and then exported to the second country?
2. **Internalization**: Why is production in different locations done by one firm rather that by separate firms?

The Location Decision

- There are two main reasons for why concentrating production in a unique location may not be profit-maximizing for a multinational

1. **Horizontal FDI**: When exporting is costly, replication of the production process in a foreign market may be profit-maximizing (Nestlé, Toyota)
2. **Vertical FDI**: Multinationals may also arise when, in the presence of factor price differences across countries, a producer "breaks up" the vertical chain of production and produces some components/inputs in different countries (Intel, Toyota, Nike)

Horizontal FDI

- Consider the situation of a firm that is trying to decide how to best service a foreign market
- There are two possible options:
  1. *Export*: Increase production from the currently existing plant and export this additional amount
  2. *Horizontal FDI*: set up an affiliate and produce in the foreign market
- What is the basic trade-off?
  Compared to exports, horizontal FDI saves on (variable) transport costs, but leads to extra fixed costs associated with new plant

Horizontal FDI (Cont.)

- Horizontal FDI will tend to dominate exporting in industries in which:
  1. Transport costs are high
  2. Plant-level fixed costs are low
  3. Market size is large

Horizontal FDI: Evidence

Brainard (1997)

- Brainard (1997) estimates specifications of the form:

$$\begin{aligned} EXSH_i^j &= \alpha_0 + \alpha_1 FREIGHT_i^j + \alpha_2 TARIFF_i^j + \alpha_3 PWGDP_i \\ &+ \alpha_4 TAX_i + \alpha_5 TRADE_i + \alpha_6 FDI_i + \alpha_7 PSCALE^j \\ &+ \alpha_8 CSCALE^j + \mu_i^j. \end{aligned}$$

- Where (all variables in logs):
  - $EXSH_i^j$ = The share of total foreign sales by US firms in country i accounted for by exports to country i
  - $FREIGHT_i^j$ = Freight costs (as % of good value)
  - $PWGDP_i$ = Difference in country's per capita GDP rel to US
  - TAX_i = Corporate income tax rate in i, from PWC
  - $TRADE_i$ = Survey measure of country's 'openness to trade'
  - FDI_i = Ditto for 'openness to FDI'
  - $PSCALE^j$ = Plant scale: Size (production workers) of typical US plant
  - $CSCALE^j$ = Corporate scale: Number of non-prodn. workers

Horizontal FDI: Evidence

Brainard (1997)

TABLE 1—EXPORT SHARES (DEPENDENT VARIABLE = EXSH)

Independent variable	OLS (i)	Country random effects (ii)	Industry random effects (iii)	OLS (iv)	Country random effects (v)	Industry random effects (vi)
FREIGHT	−0.2451	−0.2009	−0.1264	−0.2717	−0.2852	−0.1228
	(−5.429)	(−3.996)	(−2.672)	(−4.578)	(−4.813)	(−1.767)
TARIFF	−0.274	−0.2814	−0.0872	−0.3707	−0.3895	−0.1644
	(−6.239)	(−5.666)	(−2.038)	(−7.447)	(−7.259)	(−3.412)
PWGDP	0.330	0.3231	0.1922	0.2958	0.3050	0.1461
	(4.272)	(2.371)	(2.909)	(3.747)	(2.677)	(2.122)
TAX	−1.335	−1.3566	−0.9853	−0.5695	−0.5787	−0.2150
	(−4.882)	(−2.809)	(−4.258)	(−1.795)	(−1.223)	(−0.792)
TRADE	1.9114	1.9395	2.1306	1.6558	1.5841	1.8477
	(7.416)	(4.149)	(9.887)	(6.305)	(4.035)	(8.262)
FDI	−2.6163	−2.6302	−2.8126	−0.8343	−0.8502	−0.9120
	(−9.264)	(−5.077)	(−11.944)	(−1.810)	(−1.219)	(−2.334)
PSCALE				0.1345	0.1331	0.1087
				(2.735)	(2.728)	(0.941)
CSCALE				−0.2726	−0.2734	−0.2291
				(−4.656)	(−4.722)	(−1.587)
ADJ				−0.0313	−0.0177	−0.0367
				(−0.156)	(−0.069)	(−0.188)
LANG				−0.1767	−0.1459	−0.2707
				(−1.803)	(−0.998)	(−3.223)
EC				−0.8107	−0.7808	−0.8165
				(−5.933)	(−3.823)	(−7.040)
COUP				0.6247	0.6486	0.5632
				(2.624)	(1.805)	(2.788)
Constant	3.6903	3.9210	3.5633	−4.7336	−4.4334	−5.1163
	(2.212)	(1.281)	(2.554)	(−2.042)	(−1.270)	(−2.535)
Number of observations	1,159	1,159	1,159	1,035	1,035	1,035
Adjusted R^2	0.118	0.040	0.080	0.233	0.140	0.180
χ^2		1.8446	23.425		4.8503	22.154
P		0.933	0.001		0.963	0.036

Notes: The table reports estimates of equation (3); t values are reported in parentheses. All variables are in logs. Sample-size differences reflect missing data.

Vertical FDI

- Consider the situation of a firm that is trying to decide how to produce a final good at minimum average cost
- The production process entails two tasks: (i) a skill-intensive task (R&D) and (ii) an unskill-intensive task (assembly)
- There are two possible options:
  1. *Domestic production*: Perform both tasks at Home
  2. *Vertical FDI*: Perform one of the two tasks abroad
- What is the basic trade-off?
  Compared to domestic production, vertical FDI allows to take advantage of factor price differences across countries, but it involves transport and communication costs

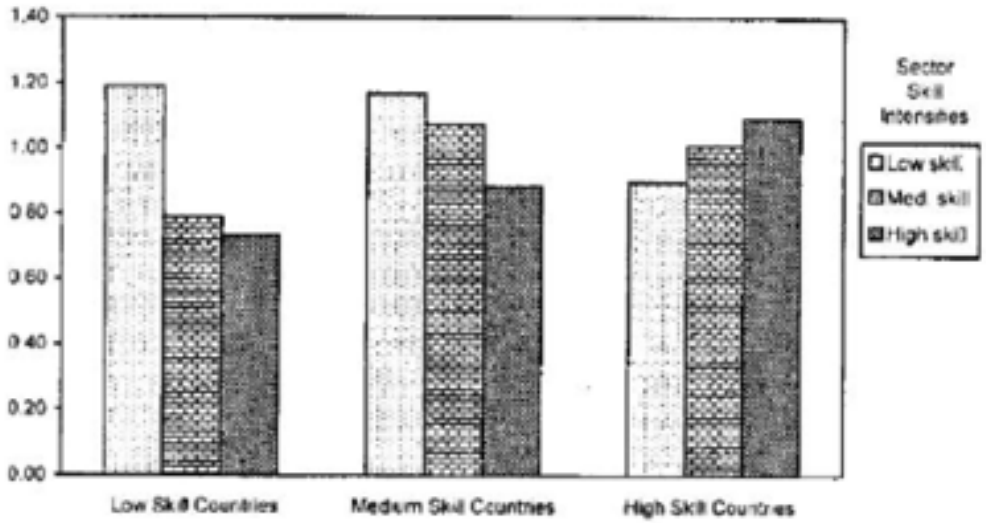
Vertical FDI (Cont.)

- Vertical FDI will tend to:
  1. Decrease in transport and communication costs
  2. Increase in relative factor endowment differences across countries (which generate factor price differences)
  3. Increase in relative factor intensity differences across tasks
- Notice also that while in Horizontal FDI and trade substitutes, vertical FDI and trade are complements

Vertical FDI: Evidence

- Yeaple (2003) shows that U.S. MNEs favor skilled-abundant countries over unskilled-abundant countries in skill intensive sectors
  - but instead favor unskilled-abundant countries in unskilled-intensive industries

FIGURE 1.—REVEALED COMPARATIVE ADVANTAGE INDICES FOR COUNTRIES GROUPED BY SKILL ENDOWMENTS AND INDUSTRIES GROUPED BY SKILL INTENSITY



Internalization

- In developing their global sourcing strategies, firms not only decide where to locate different stages of the value chain, but also the extent of control over them
- Why will fragmentation occur within or outside the multinational's boundary?
  1. *Technology transfer*: transfer of knowledge or technology may be easier within a single organization than through a market transaction (e.g., licensing)
     - Patent or property rights may be weak or non-existent
     - Knowledge may not be easily packaged and sold
  2. *Vertical integration*: consolidation of different stages of production process
     - Intrafirm purchases may avoid or attenuate contractual difficulties
     - Integration may affect the relative bargaining power of producers and suppliers in a profit-enhancing way

Internalization: Evidence

Antras (2003)

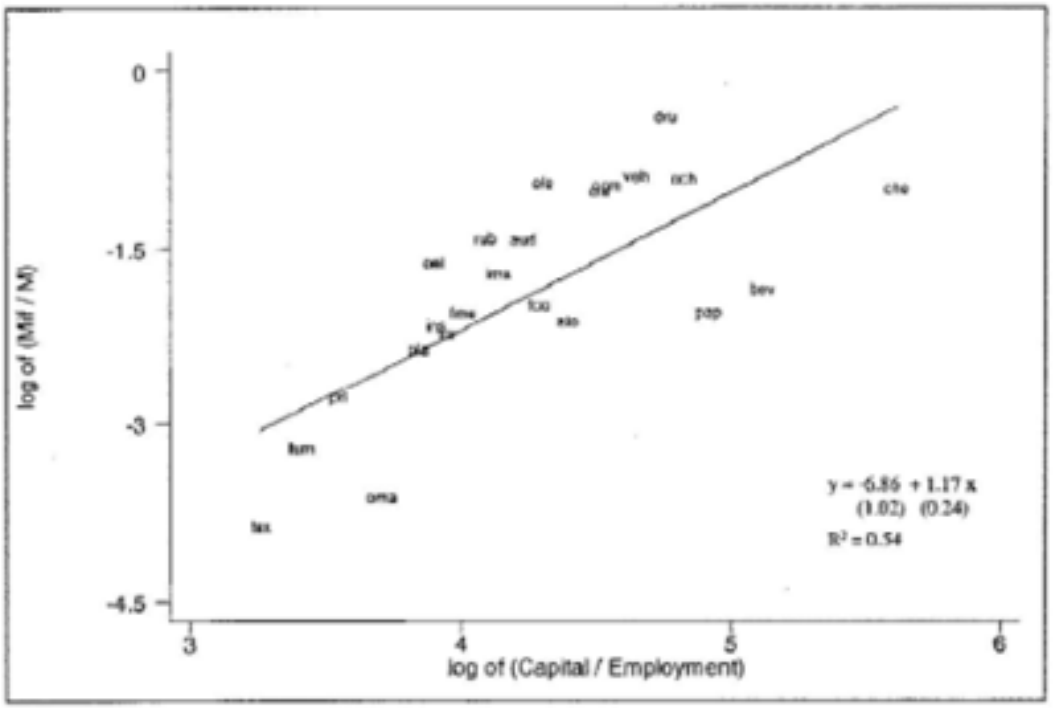


FIGURE I
Share of Intrafirm U. S. Imports and Relative Factor Intensities

Internalization: Evidence

Antras (2003)

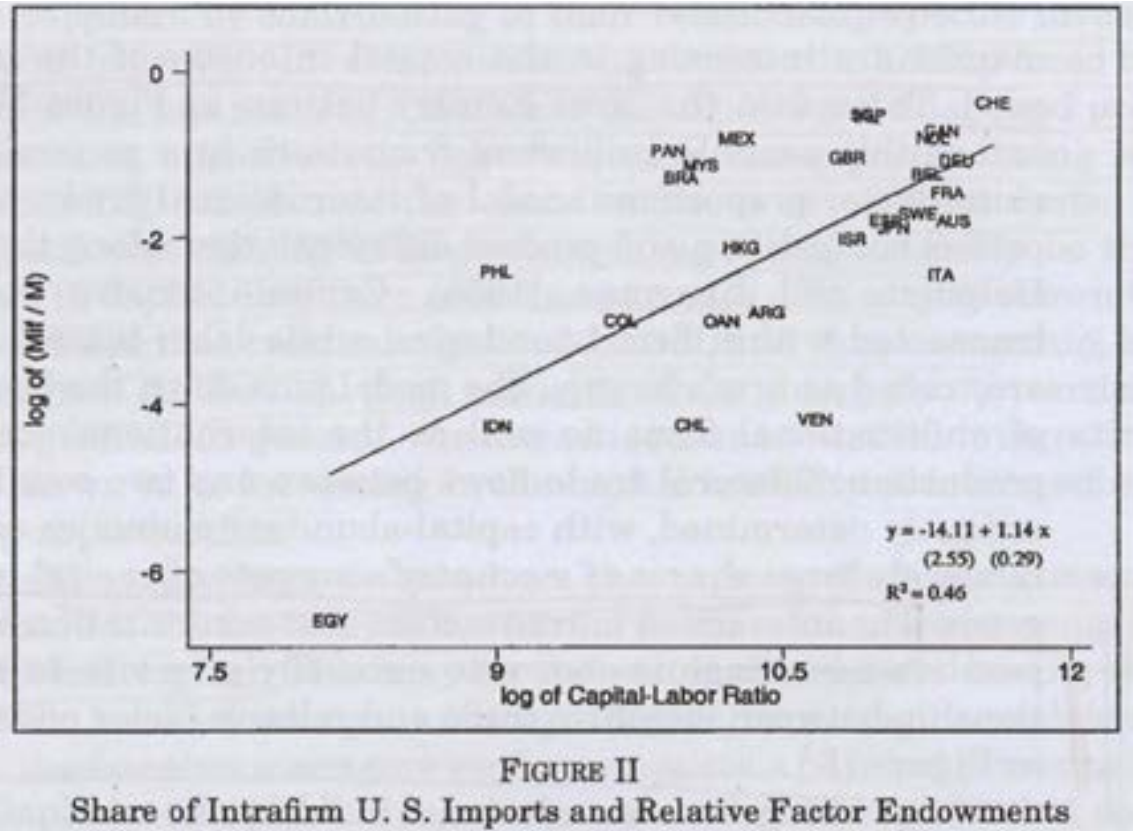


FIGURE II
Share of Intrafirm U. S. Imports and Relative Factor Endowments

14.54 International Trade

Fall 2016