# International Trade: Lesson 3 M2 CIE

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# Syllabus

**Lesson 4: The role of MNF in international trade**

- Why do some firms operate in more than one country while others do not?
- What determines in which countries production facilities are located?
- Why do firms own foreign facilities rather than simply contract with local producers or distributors?

# Syllabus

**Lesson 4: The role of MNF in international trade**

- (1) Determinants of multinational activity: Why do some firms operate in more than one country while others do not?
- The fragmentation of production process across borders
- The proximity-concentration hypothesis
- Main incentives of FDI

**Lesson 4: The role of MNF in international trade**

- (2) Location decision: What determines in which countries production facilities are located?
- Which are the characteristics of host countries that determine the MNF's location decision?
- Factor endowments, institutions, etc..

# The determinants of firms global sourcing strategies

- (3) Sourcing mode choice: a central decision that firms face in developing their foreign sourcing mode strategies is:
- Whether to keep some stages of production within their boundaries by setting-up an affiliate abroad or
- To subcontract them out to independent suppliers in the host country

# The determinants of firms global sourcing strategies

- (1) The first strategy is called "'**Vertical integration**"' or "'**intra-firm trade**"': the multinational makes an investment abroad creating a new affiliate (FDI);

- (2) The second strategy is "'**Outsourcing**"' when the multinational firm decides to buy the intermediate good from an independent supplier abroad.

# Lesson 4

- Antras, P and S, Yeaple, 2015 . Multinational Firms and the Structure of International Trade, chapter 2, Handbook of International Economics, Volume 4.

- **Aim**

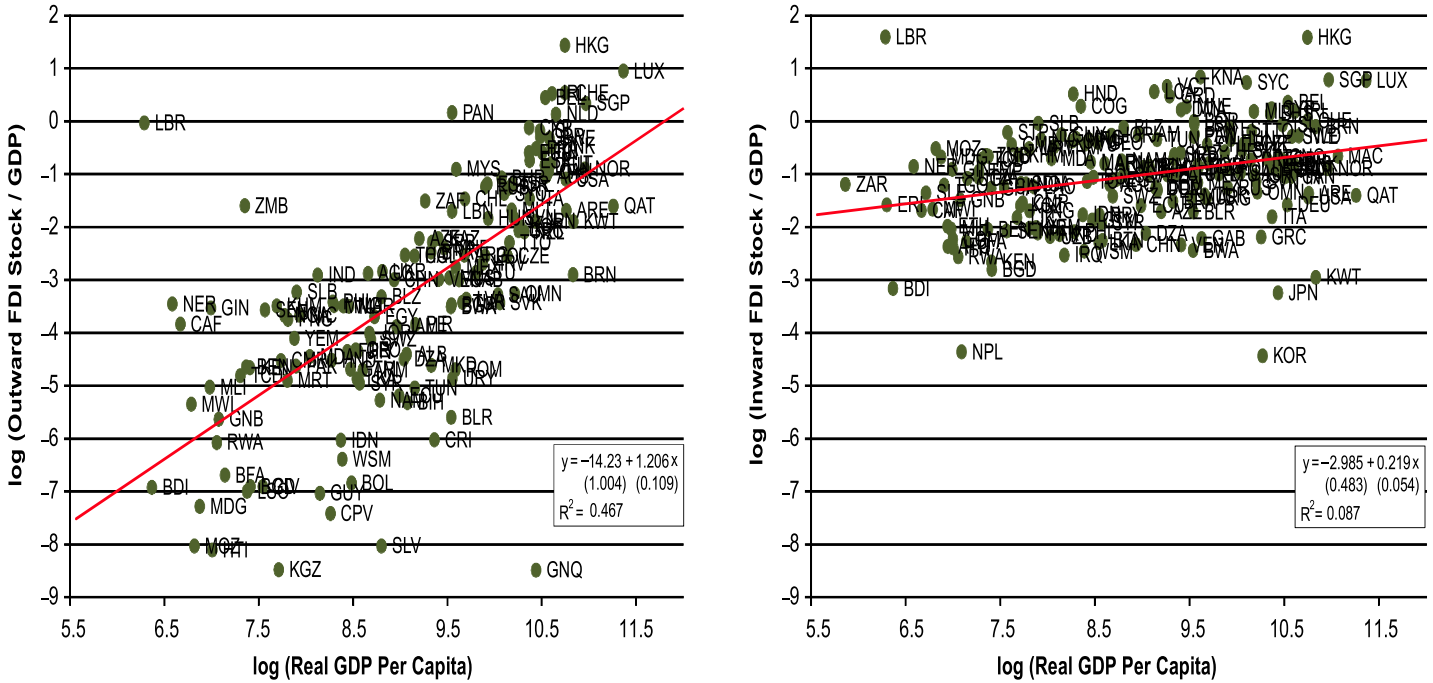
- Review of theoretical and empirical literature on the determinants of MNF, location and sourcing mode decisions:

- (1) Theoretical models: introduce MNF activity in monopolistic competition with CES preferences (Krugman, 1980 and Melitz 2003).

- (2) Empirical evidence: cross-country, sector and firm level studies testing the main predictions of those models.

- **Stylized facts**
- Fact 1: Multinational activity is primarily concentrated in developed countries where it is mostly two-way.
- Developing countries are more likely to be the destination of multinational activity than the source.
- Developed countries are more engaged in both outward and inward flows than less developed countries, but the positive relationship is much more pronounced for outward flows.

# Lesson 4: Main Results




Sources: UNCTAD and World Bank

**Figure 2.1** Aggregate FDI Stocks and Development

- **Stylized facts**
- Fact 2: cross-sectors determinants of MNF
- Substantial variation across industries in the share of real activity contributed by multinational firms.
-

- **Stylized facts**
- Fact 2:The relative importance of multinationals in economic activity is higher in capital-intensive and R&D intensive goods,
- and a significant share of two-way FDI flows is intra-industry in nature.

# Lesson 4: Main Results

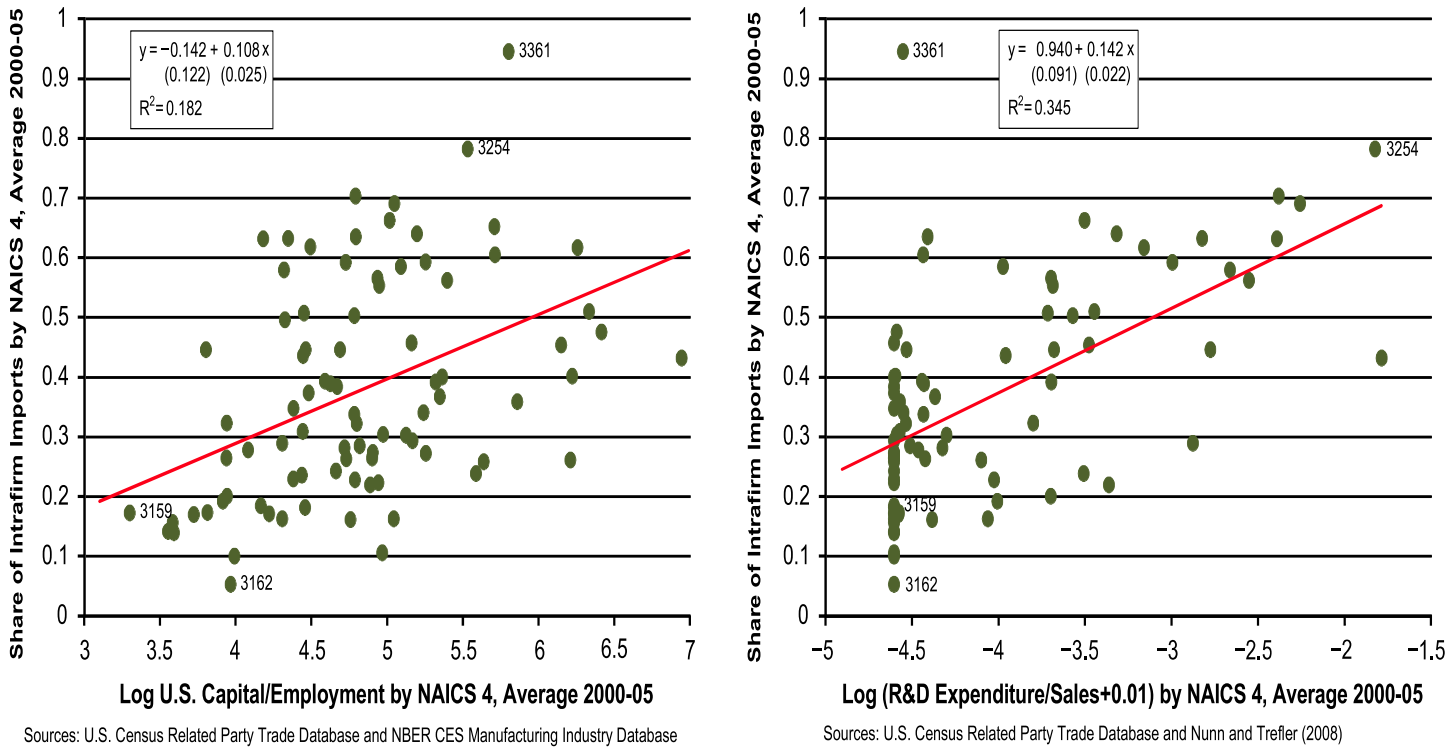


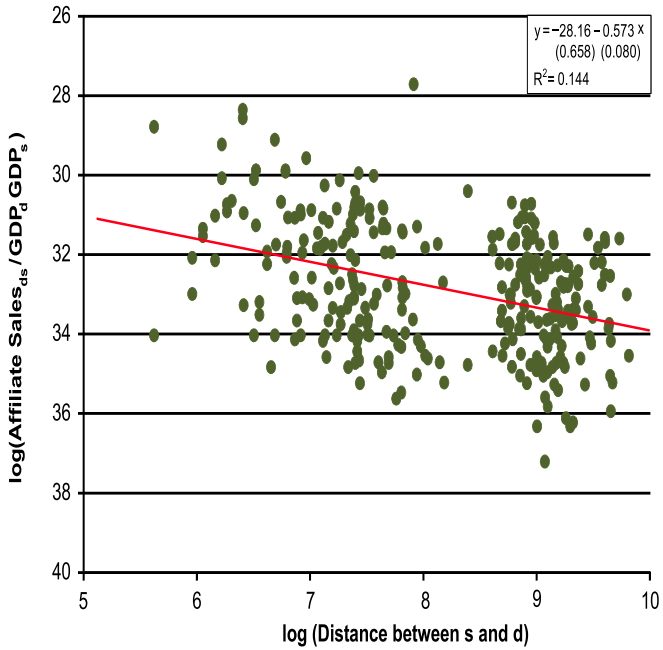

**Figure 2.2** The Share of Intrafirm Imports, Capital Intensity, and R&D Intensity

# Lesson 4

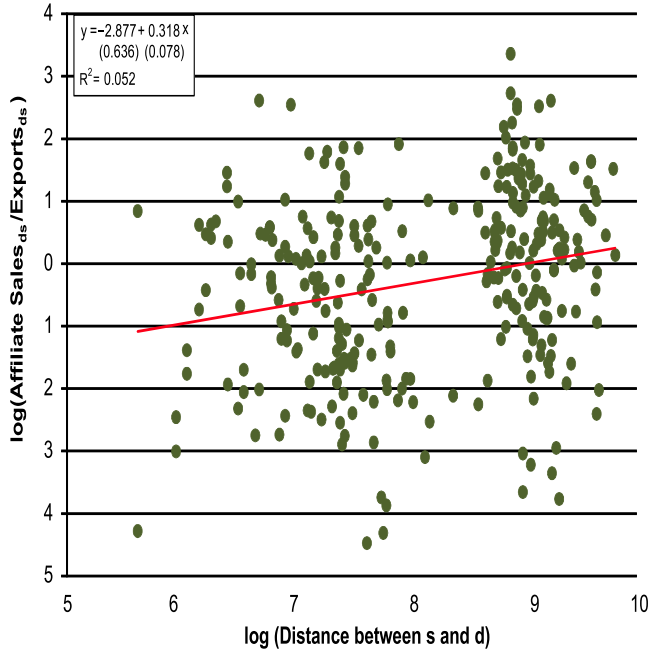
- **Stylized facts**
- Fact 3:The role of geography
- Export vs. FDI

- **Stylized facts**
- Fact 3: The production of the foreign affiliates of multinationals falls off in distance,
- as distance increases affiliate sales are falling less rapidly than trade volumes

# Lesson 4: Main Results




Sources: Ramondo (2013) and World Development Indicators




Sources: Ramondo (2013), Feenstra's trade data and World Development Indicators

**Figure 2.3** Gravity, FDI Sales, and Trade Flows

# Lesson 4

- **Stylized facts**
- Fact 4: Heterogeneous characteristics of MNF

- **Stylized facts**

- Fact 4: Both the parents and the affiliates of multinational firms tend to be larger, more productive,more R&D intensive, and more export oriented than non-multinational firms.

# Lesson 4: Main Results

**Table 2.1** Affiliates Relative to Local Firms (Percentage Accounted for by Affiliates)

| | 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).

- **Stylized facts**

- Fact 5: Within multinational enterprises, parents are relatively specialized in R&D while affiliates are primarily engaged in selling goods in foreign markets, particularly in their host market.

**Table 2.2** Destination of Affiliate Sales (%) by Industry

| | 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 |

*Source:* 2009 Benchmark Survey of U.S. Direct Investment Abroad. BEA.

# The determinants of firms global sourcing strategies

- Which are the main institutions in the host country that affect multinational firms' decisions to carry out FDI or outsourcing?

# The determinants of firms global sourcing strategies

- The main institutional determinants of the FDI versus outsourcing decision are:
- (1) **Judicial quality and property rights protection**
- Contract theory
- Regulating contractual frictions between firms and their suppliers

# The determinants of firms global sourcing strategies

- The main institutional determinants of the FDI versus outsourcing decision are:
- (2) **Labor market institutions**
- Regulating labor costs
- The power of unions during wage bargaining

# The determinants of firms global sourcing strategies

- The main institutional determinants of the FDI versus outsourcing decision are:
- (3) **Financial institutions**:
- Financial institutions (Credit over GDP ratio)
- The financial development of the host country

# Judicial quality

- How the quality of institutions and the enforcement of contracts in the host country can affect multinational firms' decisions to carry out FDI or outsourcing?

# Judicial quality

- **The rule of law index** captures the perceptions of individuals about the enforcement of contracts in a country,
- The higher the enforcement of laws and contracts in a country the greater the FDI share over outsourcing flows.

# Intellectual property rights protection

- **Intellectual property rights (IPR):**
- In particular patent protection, can affect both sourcing mode (FDI/ Outsourcing) and destination.
- firms might decide to outsource intermediate goods with high technological content when IPR are not enforced

# Labor market institutions

- How labor market regulations affect FDI and Outsourcing decision?
- How the bargaining power of unions during collective negociations affect the sourcing mode decision of multinational firms?

# Labor market institutions

- The relative profitability of outsourcing the production of the input is increasing in the bargaining power of workers.
- By fragmenting the production chain, the multinational firms **strategically reduces the revenues that are available for unions to extract**.
- **Outsourcing provides the multinational firm an alternative to avoid bargaining with unions over the rents.**

# Financial institutions

- How financial institutions affect the sourcing mode decision of multinational firms?

# Financial institutions

- **Intra-firm (vs. outsourcing) imports are higher the lower the financial development of the host country**
- The profitability of integrating the foreign supplier is higher when the financial development of the host country is low.
- When capital market frictions are important, the capacity of the supplier to finance the initial cost of outsourcing with the multinational firm is undermined.
- In this case, vertical integration (intra-firm trade) alleviates financial constraints.

## FDI spillovers

- Keller and Yeaple, (2009), Multinational Enterprises, International Trade, and Productivity Growth: Firm- Level Evidence from the United States, Review of Economics and Statistics, 2009, 91(4): 821-831.

## FDI spillovers

- Keller and Yeaple, (2009), Multinational Enterprises, International Trade, and Productivity Growth: Firm- Level Evidence from the United States, Review of Economics and Statistics, 2009, 91(4): 821-831.
- Estimate international technology spillovers to U.S. manufacturing firms via imports and foreign direct investment (FDI) between the years of 1987 and 1996
- The effect of foreign affiliates on domestic firms productivity
- Horizontal spillovers

## Contribution

- First to show that multinationals can cause economically important productivity benefits to domestically-owned firms

## FDI spillovers

- Estimate FDI spillovers depending on sector and domestic firm characteristics :
- High-technology vs. Low-technology sectors
- Small vs. larger domestic firms

## Main mechanisms

- FDI Spillovers: positive externalities of MNF affiliates in host countries
- Import Spillovers: externalities associated with imports activity.

## Main mechanisms FDI Spillovers

- MNF are more productive and to do more R&D than purely domestic firms, and the knowledge transferred from parent to its foreign affiliates may spillover to host country firms.
- Host country firms may also obtain access to foreign knowledge by hiring away the employees of the foreign affiliates of multinationals. (pool of highly skilled technicians)
- Vertical linkages and the provision of specialized inputs

## Main mechanisms Imports Spillovers

- Imports in the same industry: foreign competition channel
- Imported inputs channel (not considered)

## Main results

- FDI leads to substantial productivity gains for domestic firms
- FDI spillovers are particularly strong in high-tech sectors, whereas they are largely absent in low-tech sectors
- Small firms with low productivity benefit more from FDI spillovers than larger and more productivity firms.
- The evidence for import spillovers is much weaker.

## Data

- Unbalanced sample of manufacturing firms in the United States from Standard and Poor Compustat database
- Publicly traded companies and publishes data from the companies' balance sheets according to legal reporting requirements
- Matched with data at the industry level (50 industries) in which the U.S. Bureau of Economic Analysis (BEA), responsible for reporting U.S. FDI data, is classifying total manufacturing activity
- Estimation strategy: exploit industry variation

**TABLE 2: Exposure to Imports and FDI by Aggregated BEA Industries**

| | Import Share* in % | | | | FDI Share** in % | | | |
|---|---|---|---|---|---|---|---|---|
| | 1987 | 1992 | 1996 | Change 1996/87 | 1987 | 1992 | 1996 | Change 1996/87 |
| Manufacturing | 12.9 | 14.0 | 16.5 | 3.6 | 7.7 | 11.5 | 11.7 | 4.0 |
| Food and Kindred Products | 3.7 | 3.7 | 4.1 | 0.4 | 8.4 | 11.9 | 9.9 | 1.5 |
| Textile Mill Products | 8.1 | 8.8 | 10.1 | 2.0 | 3.7 | 6.7 | 7.3 | 3.6 |
| Apparel and Oth. Textile | 24.7 | 29.1 | 33.4 | 8.7 | 1.1 | 3.2 | 4.5 | 3.4 |
| Wood and Furniture | 7.6 | 8.5 | 11.2 | 3.6 | 1.9 | 2.6 | 2.1 | 0.2 |
| Paper | 8.4 | 8.0 | 9.0 | 0.6 | 6.9 | 7.5 | 8.8 | 1.9 |
| Printing and Publishing | 1.1 | 1.2 | 1.5 | 0.4 | 5.4 | 6.6 | 7.3 | 1.9 |
| Chemicals | 7.6 | 9.2 | 11.4 | 3.8 | 26.2 | 32.1 | 31.2 | 5.0 |
| Rubber and Plastic | 5.7 | 7.5 | 8.6 | 2.9 | 6.6 | 14.8 | 15.4 | 8.8 |
| Stone, Glass, and Mineral | 8.1 | 9.5 | 10.5 | 2.4 | 14.5 | 20.9 | 21.6 | 7.1 |
| Primary metals | 14.8 | 15.0 | 18.1 | 3.3 | 12.2 | 15.9 | 14.4 | 2.2 |
| Fabricated Metals | 4.6 | 5.6 | 6.6 | 2.0 | 4.1 | 8.3 | 9.4 | 5.3 |
| Industrial Machines | 17.9 | 22.9 | 24.5 | 6.6 | 5.9 | 11.3 | 11.2 | 5.3 |
| Electronics | 20.6 | 25.2 | 27.3 | 6.7 | 12.0 | 17.2 | 18.6 | 6.6 |
| Motor Vehicles | 29.3 | 26.0 | 26.7 | -2.6 | 6.6 | 11.0 | 14.6 | 8.0 |
| Other Transport | 7.4 | 9.2 | 12.9 | 5.5 | 1.0 | 4.9 | 4.2 | 3.2 |
| Instruments | 11.7 | 12.5 | 15.6 | 3.9 | 7.4 | 11.9 | 13.3 | 5.9 |

* Imports over imports plus shipments; based on Feenstra (2002), Bartelsman and Gray (2001)

** Employment in foreign-owned subsidiaries over total employment; based on Survey of Current Business, various issues, and Bartelsman and Gray (2001)

- Empirical strategy
- Identifying FDI and import spillovers
- First difference estimation of domestic firms' TFP changes in the presence of MNF and imports at the industry level:
- $\Delta TFP_{ijt} = \gamma_1 \Delta FDI_{jt} + \gamma_2 \Delta Imp_{jt} + \epsilon_{ijt}$
- $FDI_{jt}$ the share of the foreign-owned affiliates' employment (denoted f) in foreign affiliates employment plus employment of U.S.-owned firms (denoted by e) by industry j to which firm i belongs
- $Imp_{jt}$ the share of U.S. imports (denoted m) in imports plus total shipments (denoted d) of the industry to which the firm belongs
- Endogeneity issue

**Table 4: OLS Results With One-, Two-, and Three-year Differences**

| | (4.1) | (4.2) $\Delta^2$ | (4.3) $\Delta^3$ |
|---|---|---|---|
| R&D | 0.001<br>(0.001) | 0.003<br>(0.002) | 0.005<br>(0.003) |
| Cap. Utilization | -0.030<br>(0.057) | -0.067<br>(0.075) | -0.163<br>(0.316) |
| Mkt Share | -0.089<br>(0.102) | -0.292<br>(0.210) | -0.269<br>(0.316) |
| Firm Mark-up | -0.009<br>(0.004) | -0.005<br>(0.005) | -0.089<br>(0.041) |
| Industry Mark-up | 0.367<br>(0.177) | 0.998<br>(0.417) | 1.034<br>(0.453) |
| FDI | | | |
| Current | 0.213<br>(0.122) | 0.379<br>(0.196) | 0.411<br>(0.233) |
| Lagged One | 0.303<br>(0.112) | | |
| Lagged Two | -0.049<br>(0.097) | | |
| Imports | | | |
| Current | 0.480<br>(0.407) | 0.341<br>(0.480) | 0.210<br>(0.392) |
| Lagged One | 0.754<br>(0.323) | | |
| Lagged Two | -0.236<br>(0.291) | | |
| F-test FDI | 4.58<br>(0.033) | | |
| F-test Imports | 2.20<br>(0.139) | | |
| Obs<br>R-squared | 5,895<br>0.110 | 3,175<br>0.169 | 2,226<br>0.217 |

**Table 5: Differential Spillover Estimates by Size and Productivity**

| | (5.1) $\Delta$ (Size) | (5.2) $\Delta^2$ (Size) | (5.3) $\Delta^3$ (Size) | (5.4) $\Delta^3$ (TFP) |
|---|---|---|---|---|
| R&D | 0.005 | 0.013 | 0.023 | -0.002 |
| | (0.002) | (0.004) | (0.006) | (0.009) |
| Cap. Utilization | -0.034 | -0.076 | -0.180 | -0.161 |
| | (0.058) | (0.077) | (0.122) | (0.116) |
| Mkt Share | -0.050 | -0.290 | -0.198 | -0.371 |
| | (0.109) | (0.215) | (0.339) | (0.297) |
| Firm Mark-up | -0.009 | -0.005 | -0.080 | -0.071 |
| | (0.004) | (0.005) | (0.036) | (0.040) |
| Industry Mark-up | 0.359 | 0.987 | 0.984 | 1.047 |
| | (0.177) | (0.419) | (0.464) | (0.446) |
| FDI | | | | |
| Current | 0.338 | 0.986 | 1.184 | 1.192 |
| | (0.275) | (0.345) | (0.498) | (0.500) |
| Current*Size | -0.181 | -1.022 | -1.349 | -1.785 |
| | (0.360) | (0.364) | (0.590) | (0.885) |
| Lagged1 | 0.802 | | | |
| | (0.266) | | | |
| Lagged1* SizeLagged1 | -0.832 | | | |
| | (0.348) | | | |
| Imports | | | | |
| Current | 0.698 | -0.194 | 0.729 | -0.719 |
| | (0.462) | (0.873) | (0.656) | (0.822) |
| Current*Size | -0.361 | 0.908 | -0.804 | 2.201 |
| | (0.774) | (1.036) | (0.824) | (1.946) |
| Lagged1 | 0.606 | | | |
| | (0.507) | | | |
| Lagged1* SizeLagged1 | 0.256 | | | |
| | (0.703) | | | |
| Size | -0.045 | -0.087 | -0.125 | -0.093 |
| | (0.067) | (0.027) | (0.045) | (0.084) |
| SizeLagged1 | 0.023 | | | |
| | (0.064) | | | |
| F-test FDI | 3.50 | 4.34 | 2.87 | 2.90 |
| | (0.008) | (0.014) | (0.060) | (0.058) |
| F-test Imports | 1.61 | 0.83 | 0.63 | 0.70 |
| | (0.170) | (0.439) | (0.534) | (0.500) |
| Obs | 5,895 | 3,175 | 2,226 | 2,226 |
| R-squared | 0.112 | 0.177 | 0.232 | 0.233 |

Figures in parentheses are standard errors clustered by industry-year combination.
The null hypothesis of the F-test is that the sum of coefficients equals zero.

- Endogeneity issue
- Identifying FDI and import spillovers
- FDI could be attracted to industries in which productivity is growing relatively fast on average.
- This would lead to a positive correlation of FDI and productivity that does not provide evidence for FDI spillovers.

# Lesson 4

- Dealing with endogeneity issue
- IV estimation using instruments:
- contemporaneous changes in shipping costs and tariffs (see Brainard 1997)
- lagged levels of the real exchange rate interacted with industry dummies (see Froot and Stein 1991)
- The instruments are valid: the over-identification test statistic

**Table 6: Instrumental Variable Estimation**

| | (6.1) $\Delta$ | (6.2) $\Delta^2$ |
|---|---|---|
| R&D | 0.003 | 0.004 |
| | (0.001) | (0.003) |
| Cap. Utilization | 0.032 | -0.022 |
| | (0.064) | (0.071) |
| Mkt Share | -0.107 | -0.520 |
| | (0.116) | (0.202) |
| Firm Mark-up | -0.010 | -0.004 |
| | (0.005) | (0.006) |
| Industry Mark-up | 0.395 | 1.094 |
| | (0.187) | (0.375) |
| FDI | | |
| Current | 0.028 | 0.645 |
| | (0.366) | (0.232) |
| Lagged One | 0.885 | |
| | (0.383) | |
| Lagged Two | 0.034 | |
| | (0.271) | |
| Imports | | |
| Current | 1.618 | 0.784 |
| | (0.686) | (0.455) |
| Lagged One | -1.804 | |
| | (0.916) | |
| Lagged Two | 1.380 | |
| | (0.857) | |
| F-test FDI | 3.47 | |
| | (0.064) | |
| F-test Imports | 1.98 | |
| | (0.161) | |
| First-stage FDI | | |
| Partial R-sq | 0.33 | 0.75 |
| F-statistic | 3.1 | 5.1 |
| First-stage Imports | | |
| Partial R-sq | 0.22 | 0.77 |
| F-statistic | 1.8 | 5.8 |
| Obs | 3,746 | 2,407 |
| R-squared | 0.135 | 0.200 |

Figures in parentheses are standard errors clustered by industry-year combination.
The null hypothesis of the F-test is that the sum of coefficients equals zero.

- Dealing with endogeneity issue
- Both IV specifications suggest that FDI indeed has positive spillover effects for the domestic economy.
- The coefficient estimates in the IV specifications imply larger effects than the corresponding OLS regressions:
- 0.885 versus 0.516 for oneyear differences, and 0.645 versus 0.379 for two-year differences estimation

- Quantification
- FDI spillovers account for between 8US manufacturing productivity growth during 1987-96.
- Which factors drive FDI spillovers?

**Table 8: FDI Spillovers in High-Technology versus Low-Technology Industries**

| | (8.1) Hi-Tech; $\Delta$ | (8.2) Low-Tech; $\Delta$ | (8.3) Hi-Tech; $\Delta^2$ | (8.4) Low-Tech; $\Delta^2$ |
|---|---|---|---|---|
| R&D | 0.003 | 0.000 | 0.005 | 0.000 |
| | (0.002) | (0.001) | (0.003) | (0.002) |
| Cap. Utilization | 0.051 | -0.083 | -0.020 | -0.007 |
| | (0.068) | (0.048) | (0.114) | (0.075) |
| Mkt Share | 0.282 | -0.139 | -0.019 | -0.318 |
| | (0.286) | (0.111) | (0.618) | (0.222) |
| Firm Mark-up | -0.016 | -0.004 | 0.030 | -0.008 |
| | (0.003) | (0.001) | (0.076) | (0.003) |
| Industry Mark-up | 0.831 | 0.058 | 1.403 | 0.388 |
| | (0.220) | (0.079) | (0.409) | (0.153) |
| FDI | | | | |
| Current | 0.257 | -0.012 | 0.680 | 0.133 |
| | (0.173) | (0.098) | (0.390) | (0.153) |
| Lagged One | 0.412 | 0.173 | | |
| | (0.202) | (0.107) | | |
| Lagged Two | 0.241 | -0.135 | | |
| | (0.225) | (0.085) | | |
| Imports | | | | |
| Current | 0.185 | 0.175 | -0.340 | 0.235 |
| | (0.487) | (0.161) | (0.901) | (0.158) |
| Lagged One | 0.738 | 0.318 | | |
| | (0.541) | (0.144) | | |
| Lagged Two | -1.415 | -0.101 | | |
| | (0.773) | (0.146) | | |
| F-test FDI | 5.23 | 0.00 | | |
| | (0.026) | (0.972) | | |
| F-test Imports | 0.170 | 1.87 | | |
| | (0.683) | (0.173) | | |
| Obs | 2,794 | 3,101 | 1,506 | 1,669 |
| R-squared | 0.133 | 0.048 | 0.208 | 0.068 |

Figures in parentheses are standard errors clustered by industry-year combination.
The null hypothesis of the F-test is that the sum of coefficients equals zero.