



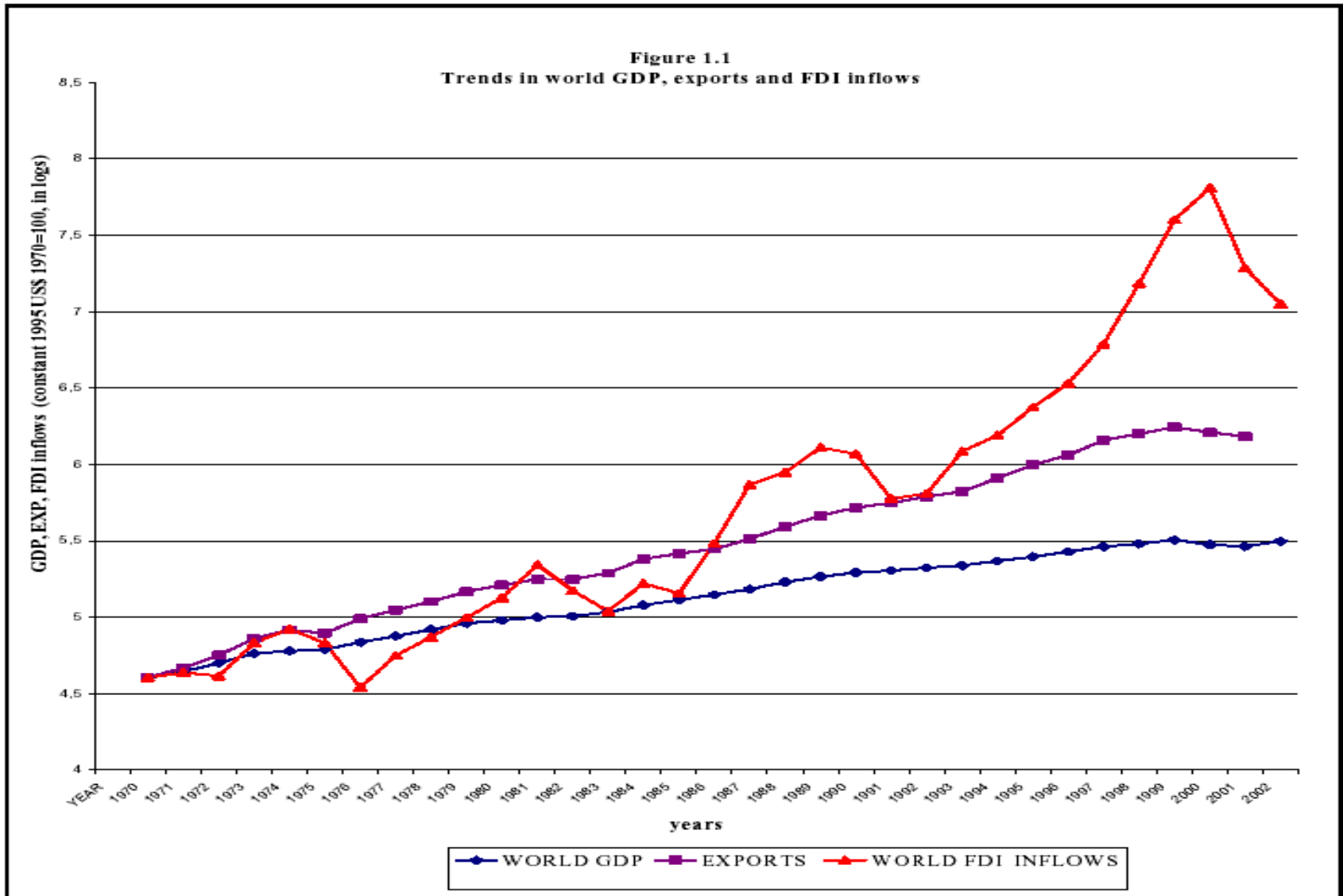
Global Political Economy

Technology Demand and FDI
Lecture 2

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Reminder (1): Our point of departure: Increasing FDI/Export ratio



Source: authors' calculations on World Bank WDI and UNCTAD data

Notes: the value of the index (100 in 1970) for the year 2002 (base year 1970=100) corresponds to 1319 for "World FDI Inflows" and to 244 for "World GDP", while for "Exports" the last available data refers to 2001 and the corresponding value of the index is 484.

Reminder (2): explaining the paradox

- The paradox: FDI/export ratio increases in spite of decreasing trading costs
- Explanation 1: demand and technology as drivers of exports and FDIs (Vernon)
- Explanation 2: different role of technology in FDI strategies → ex ante vs. ex post advantages → Asset exploiting vs. Asset seeking FDIs



Today

- Measuring asset seeking and asset exploiting FDI
- Implications for the organisation of Multinational enterprises (MNEs)
- Technology, FDI and the effects on host economies

Combining *e ante* and *ex post* advantages

FDIs exploit existing advantages

- Ex ante advantages needed to overcome “Liability of foreignness” (Hymer 1960)
- Innovation as the dynamic engine of internationalisation (Vernon 1966)

But FDIs also generate advantages

- Increasing efficiency of investing firms via economies of scale and learning (Cantwell 1989, Caves 1996)
- *The nature of ownership advantages changes*: They are needed to compete with other MNCs and to filter/absorb external knowledge (Cantwell&Narula 2001)
- *Asset seeking (AS) co-exist with Asset Exploiting (AE)* (Criscuolo et al 2005):
 - One reinforces the other
 - Firms need to use a variety of assets and their portfolio is diversified in terms of strength and weaknesses

On asset seeking in the USA (1)

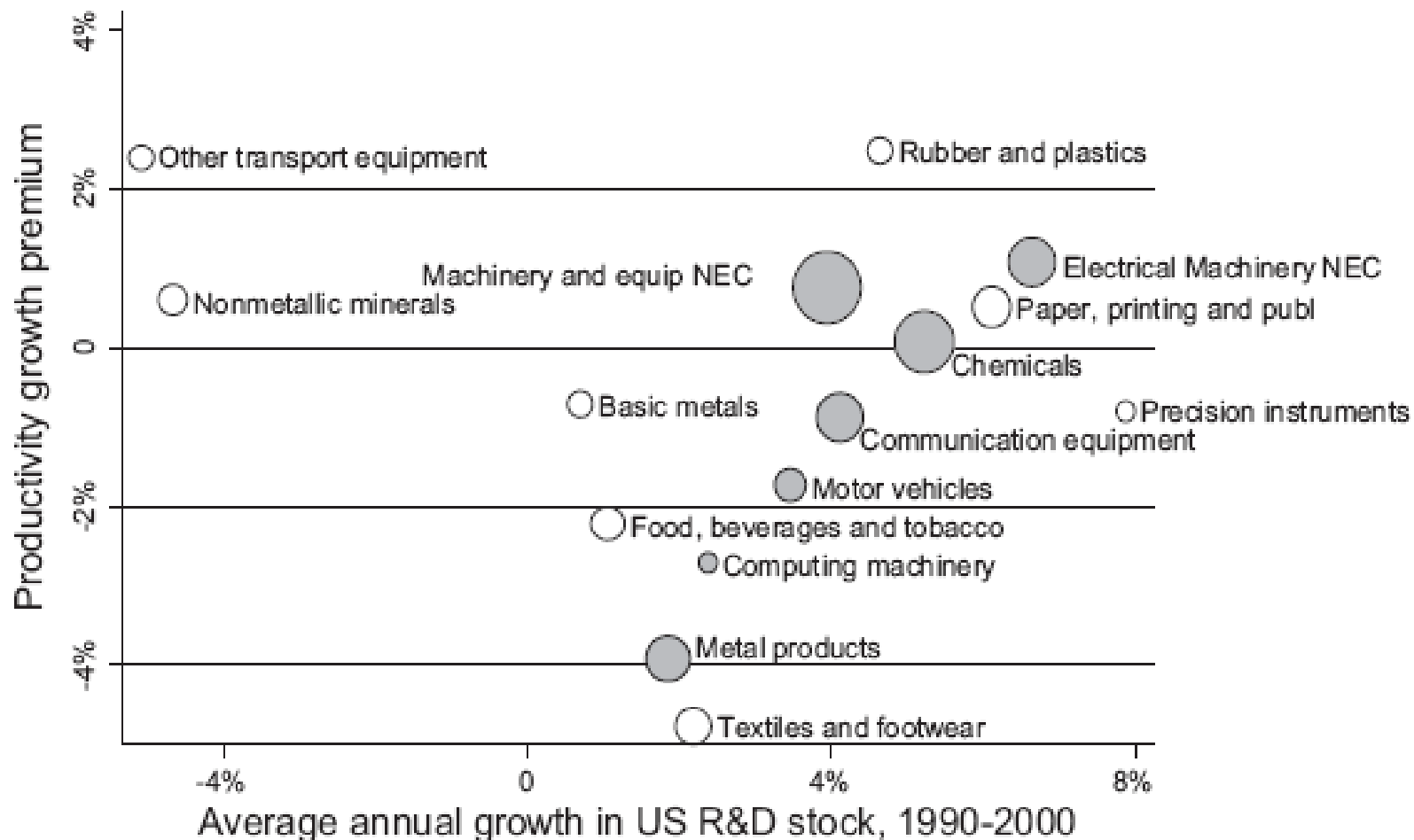


FIGURE 1. US R&D GROWTH AND “PRODUCTIVITY GROWTH PREMIUM” FOR UK FIRMS WITH A HIGH PROPORTION OF US INVENTORS

source: R.Griffith, R.Harrison, J.Van reenen, AER, 2006, p.1860

On Asset seeking in the USA(2)



“we find that UK firms that had more of their inventive activity located in the US *prior* to 1990 benefited disproportionately from the growth in US R&D in the 1990s. According to our estimates, US R&D during the 1990s was associated with 5-percent-higher TFP for UK manufacturing firms in 2000 (about \$13 billion), with the majority of the benefits accruing to firms with an innovative presence in the US.”

**Source: R.Griffith, R.Harrison, J.Van reenen,
AER, 2006, p.1860**

Types of FDI and their importance

Corporate technological activities in the home country	Technological activities in the host country	
	Weak	Strong
Weak	<p>Type 1: market-seeking HomeRTA < 1 HostRTA < 1 (Technology is not a driver of FDI) (10%)</p>	<p>Type 2: technology-seeking HomeRTA < 1 HostRTA > 1 (13%)</p>
Strong	<p>Type 3: asset-exploiting HomeRTA > 1 HostRTA < 1 (Efficiency-oriented FDI in R&D) (30%)</p>	<p>Type 4: asset-augmenting HomeRTA > 1 HostRTA > 1 (Learning-oriented FDI in R&D) (47%)</p>

Source: adapted from Patel and Vega (1999, p. 152) and from Le Bas and Sierra (2002 p.606).

Assessing the likelihood of Asset exploiting, asset seeking, and asset augmenting FDIs

Suppose that German, US and OECD firms exhibit the following patterns of patenting activity in the field of biotechnology

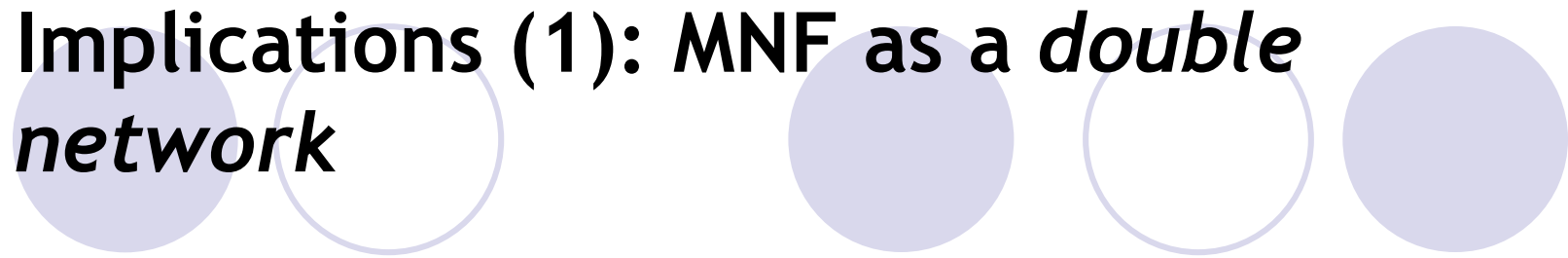
	<u>Patents in Germany</u>	<u>Patents in USA</u>	<u>Patents in OECD countries</u>
<u>Biotechnology</u>	2.000	3.500	50.000
<u>All other technological fields</u>	20.000	35.000	600.000

What kind of FDIs are German firms likely to undertake in the US in the field of biotechnology?

Preliminary conclusions on AE, AS, AA

- FDI as key vehicles of knowledge sourcing and exchange
- This is reflected in high shares of AA FDI especially when dealing with the most innovative firms
- AA are increasing at a faster rate than AS and AE
- However, AA coexist with AS and AE

Implications (1): MNF as a *double network*



- The combination of Asset Seeking and Asset Exploiting entails a transition of MNFs towards a *double network*:
 - *Internal network* of subsidiaries increasingly involved in innovative activities to adapt home technology and to absorb local knowledge
 - Development of *external networks* in order to increase *exploration* capacity
- Are internal and external networks complements or substitutes?

MNF as a *double network* (cont.ed)

Complementarity between internal and external networks

- *Transaction cost perspective*: Internal networks, uncertainty and control
 - Internal network *reduces uncertainty concerning demand and cost conditions, thus favoring further hierarchy* (Gomes-Casseres 1989)
→ increasing intensity of internal networks
 - Internal network *reduces the risk of opportunism* (by reducing *behavioural* uncertainty, generating trust and allowing outside options), *thus favoring cooperation* (Robertson and Gatignon 1998)
→ internal networks facilitate external networks
- *Dynamic efficiency perspective*: Internal networks, technological opportunities and cooperation
 - External networks are a means to explore technological opportunities.
→ *internal network increases exploration potential via external networks* (Cantwell 1995, Narula 2003, Castellani and Zanfei 2007)

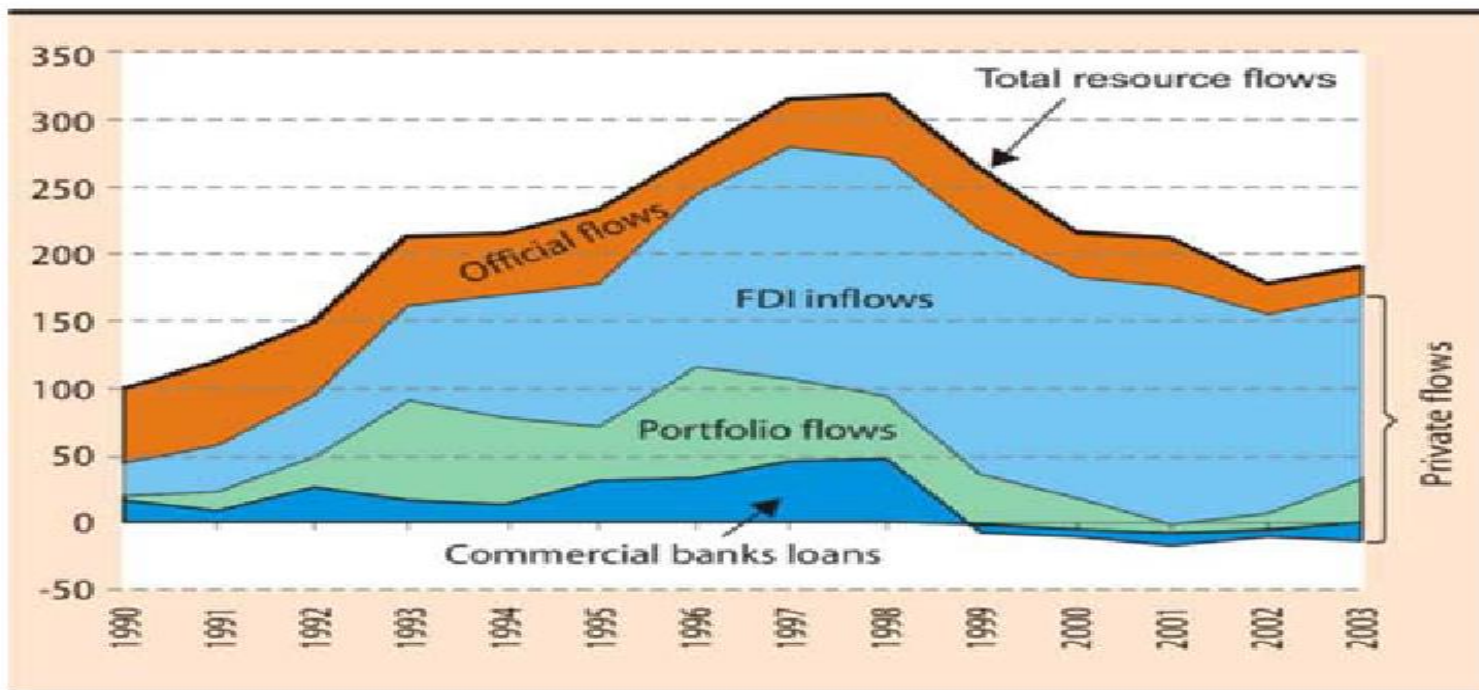
Capturing the *effects* of FDI on host economies

- How can we conceptualise the effects of MNEs on host economies
- Macro and micro effects
- Direct and indirect effects
- How are types of FDI and types of MNEs shaping the effects on host economies
 - How do asset seeking, asset exploiting and asset augmenting FDI affect host economies
 - How do MNEs differ in terms of their effects on host economies?

Macroeconomic effects of inward FDI

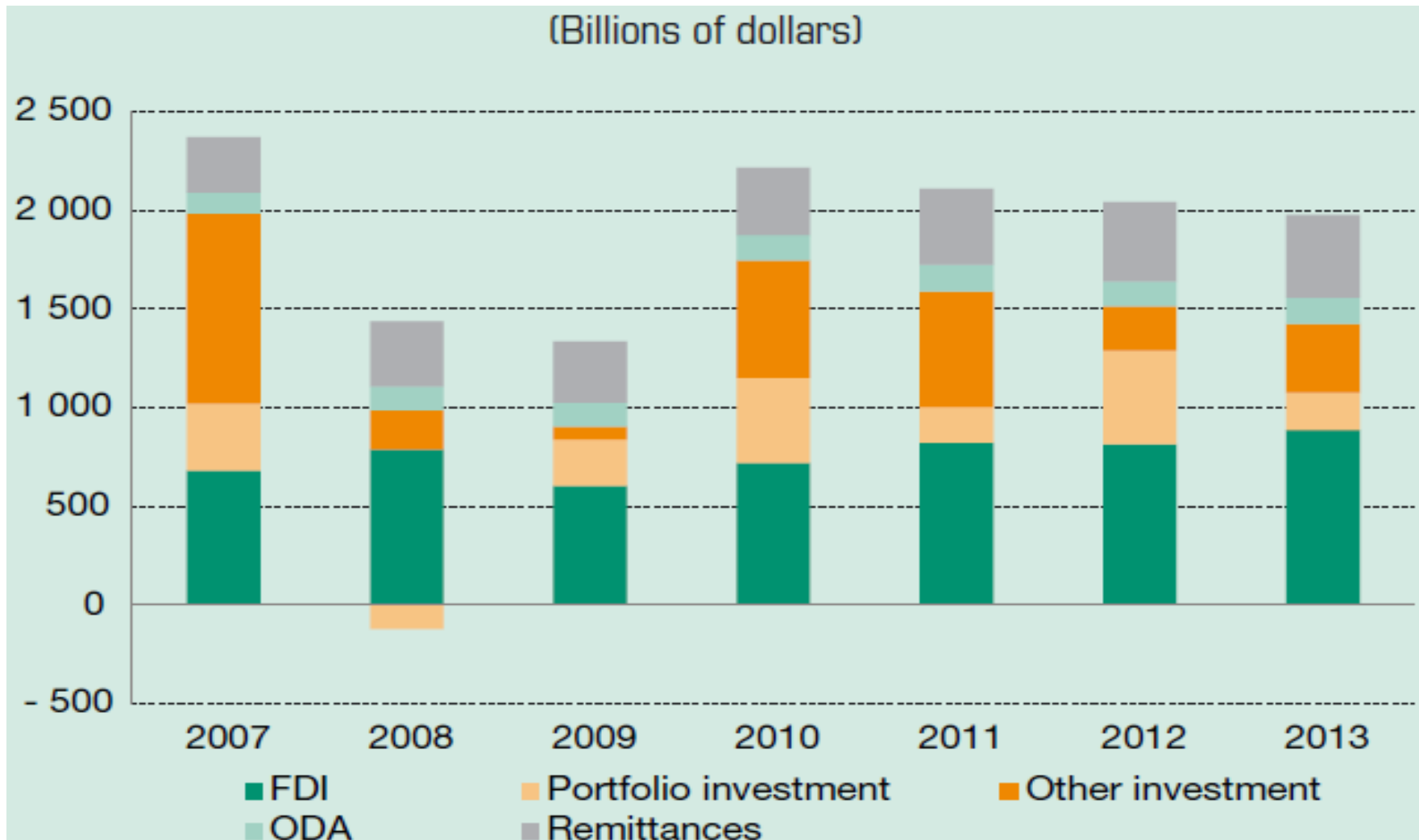
- Savings, investments and current account
 - FDI can substitute for domestic savings (especially in poor countries)

Figure 1.3. Total resource flows^a to developing countries,^b by type of flow, 1990-2003
(Billions of dollars)



Source: UNCTAD, based on World Bank 2004a.

The importance of FDIs as financial resources has increased as other sources have shrunk in the years of crisis





Macroeconomic effects of FDI (cont.ed)

- However FDIs may crowd domestic investments out by contributing to raise interest rates (if funded locally) and exchange rates
- They may contribute to national exports (both directly and indirectly)
- Employment effects depend on
 - The direction of FDI flows
 - Types of activities considered
 - Ex ante competitive conditions (need of a counterfactual analysis)

Microeconomic *direct* (compositional) effects



- ▶ Between-sectors

- ▶ MNF are not uniformly distributed across sectors, they shift the balance towards more knowledge intensive industries

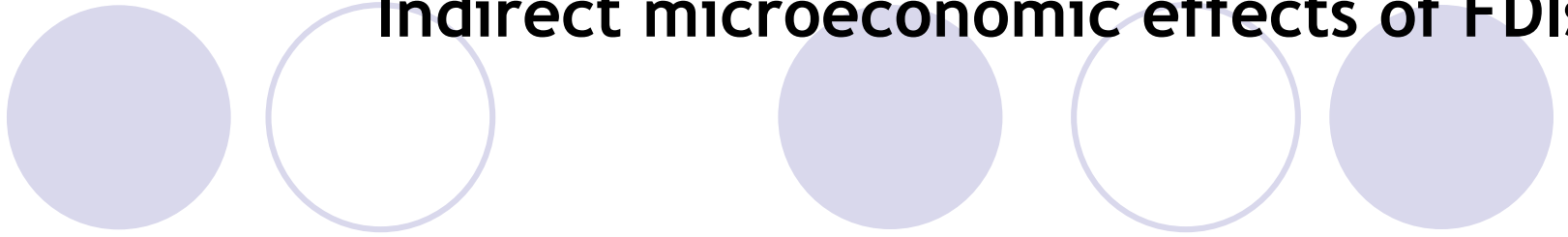
- ▶ Within-sectors

- ▶ MNFs are larger, more productive, more innovative, pay higher wages than other firms (even in the same sectors)
- MNFs can raise economic performance of the host country by bringing in a bundle of non pre-existing assets

Microeconomic **Indirect** Effects of FDI

- MNEs may affect host economies *indirectly*, i.e. *through the behaviour and performance of local firms and institutions*
- This is the case of MNE spillovers (also called externalities)
- externalities = Indirect effects on local economy via costs and performances of local firms
 - Not paid for advantages: examples of pure externalities
 - Knowledge vs. pecuniary externalities: effects via technical change (production functions) and via price changes (profit functions)

Indirect microeconomic effects of FDIs



- Channels through which externalities may occur
 - Procompetitive and anticompetitive pressures
 - Imitation and demonstration
 - Voluntary technology transfer
 - Labour market externalities
 - Backward and forward linkages

Competition effects

- **Efficiency enhancing competition effect**
 - MNEs can overcome entry barriers and induce more competition → Induce domestic firms to greater efficiency
 - MNEs entering upstream industries (e.g. services) may sell inputs at lower prices (see also forward linkages)
- **Anticompetitive pressures**
 - MNEs may monopolize markets (thus prices may raise) or bid up on input prices
 - MNEs may induce higher wages: (i) induced scarcity of labor, (ii) skill composition, (iii) risk premium (iv) training e knowledge dissipation, (v) information asymmetries

Indirect microeconomic effects of FDIs



- **Imitation/demonstration**

- Local firms may imitate and demonstrate MNFs technological and managerial practices

- **Voluntary technology transfer**

- Knowledge transfer to suppliers to improve quality of inputs
- Knowledge transfer on a reciprocity basis
- Knowledge transfer to improve MNE reputation

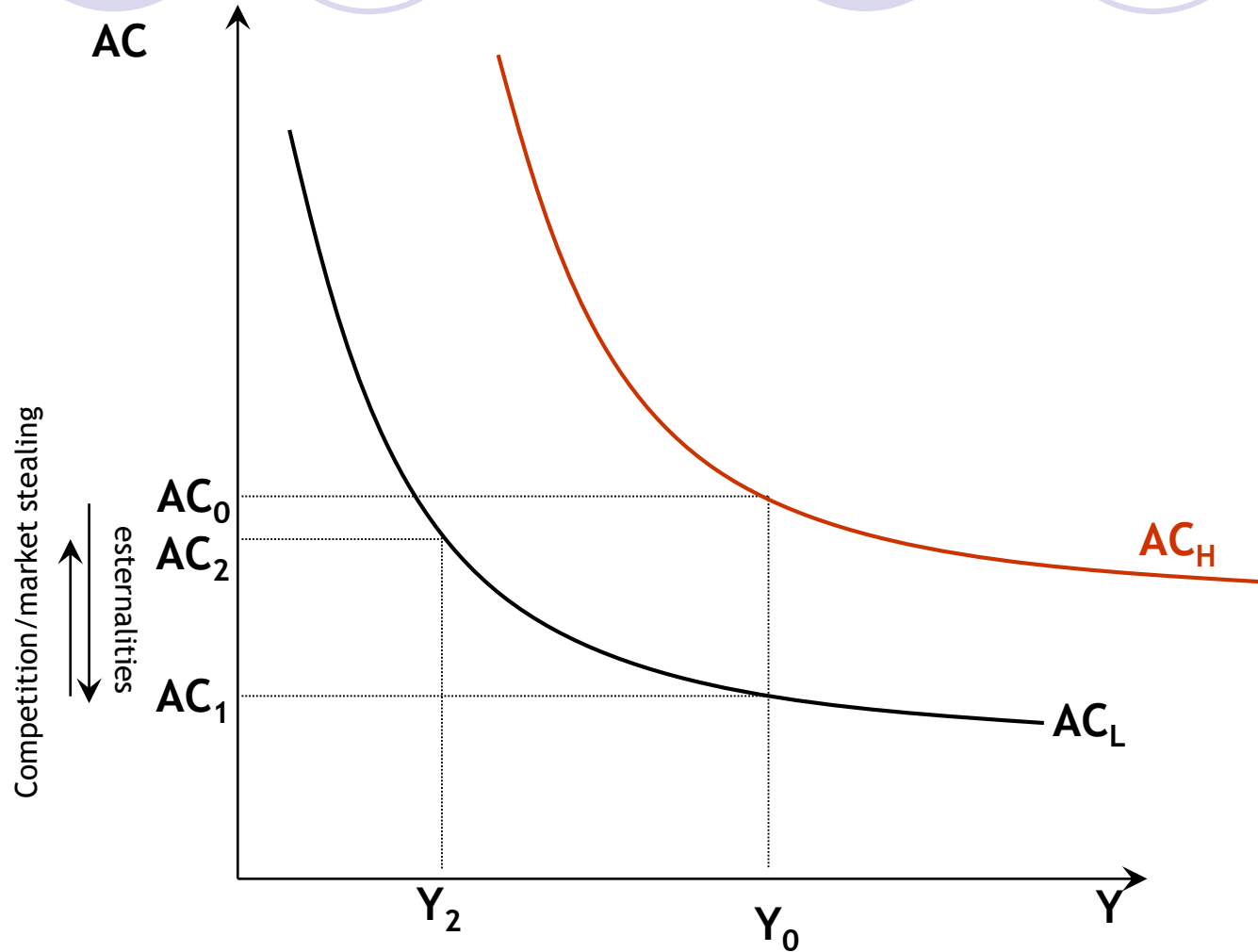
- **Labour mobility**

- MNFs train their workers which may eventually move to local firms or create his/her own firm (spin-off)

Indirect microeconomic effects of FDIs

- ▶ Backward e forward linkages
 - ▶ MNFs need inputs both upstream and downstream
 - ▶ If they use local inputs, they contribute to create/enlarge the local market → higher economies of scales for local producers of inputs
 - ▶ This will most likely drive the price down → pecuniary externality to all firms (foreign and local) using those inputs (horizontal effect)
 - ▶ Within those relations MNFs may transfer knowledge → better performance (vertical knowledge externality)
 - ▶ Knowledge may range from (i) information on markets, which make exports easier (ii) technical assistance on design, organization of production and quality (iii) assistance on purchases
 - ▶ Links with Universities and research centers are a particular type of those linkages

Market stealing vs. externality effects





Factors affecting FDI spillovers

- The quality of investors, of local firms and of local institutions matter (Cantwell 1989; Castellani et al. 2015)
- MNEs differ in terms of their linkage creation depending on:
 - What is the motivation of FDI: *Asset augmenting FDI*s are more likely to generate spillovers
 - How extensive their internal and external networks are
 - How endowed they are with knowledge assets → spillover potential and absorptive capacity
 - How experienced of local contexts they are
- MNEs may be *less* prone to spill overs than domestic firms as they lack experience of local contexts and might be worse off at *local* linkage creation (Cozza, Perani and Zanfei 2016)

Are MNEs better at linkage creation?

- The relative advantages/disadvantages of MNEs at linkage creation depends on a fundamental trade off.
 - MNEs are more prone to technical linkages because they have greater “technological advantages”, and benefit from higher “economies of common governance”, as compared to non-multinational firms.

However

- MNEs may face substantial costs to comply with technical, institutional and competitive conditions that are largely unfamiliar and location specific (“liability of foreignness”).

How firms active in Italy differ in terms of local linkage creation

	NMN	DMN	FMN
Number of observations	23,129	5,146	2,897
Number of firms ¹⁵	8,748	1,465	829
Size (average number of firm employees)	129.35	839.90	667.64
Average Intra-muros R&D expenditure per firm (in thousand euro)	1062.38	5025.83	6861.48
ATFP	6.82	6.85	6.97
Average Extra-muros R&D expenditure per firm (in thousand euro)	235.61	1338.22	1010.13
Share of firms involved in R&D Cooperation	31%	46%	50%

Controls

<i>Controls for firm categories</i>	
MN: dummy for “firm in a multinational group”	Istat-RS1 / Bureau Van <u>Dijk-Aida</u>
NMN: dummy for “non-multinational firms”	Istat-RS1 / Bureau Van <u>Dijk-Aida</u>
DMN: dummy for “firm in an Italian multinational group”	Istat-RS1 / Bureau Van <u>Dijk-Aida</u>
FMN: dummy for “subsidiary of a foreign multinational group”	Istat-RS1 / Bureau Van <u>Dijk-Aida</u>
<i>H1 – Measure of technological advantages</i>	
<u>IntraR&D</u> : (Natural Log of) Intra- <u>muros</u> R&D expenditure	Istat-RS1
<i>H2 – Measures of Economies of Common Governance (Internationalisation¹² controls)</i>	
<u>NSi</u> : ratio of countries where the firm has subsidiaries on total countries where firms in the sample have subsidiaries	Bureau Van <u>Dijk-Aida</u>
li: ratio of foreign subsidiaries on total (including domestic) subsidiaries of MNEs	Bureau Van <u>Dijk-Aida</u>
<i>H3 – Measure of Experience of Local Context</i>	
<u>ITregions</u> : number of Italian regions where Intra- <u>muros</u> R&D is undertaken	Istat-RS1
<i>Other controls</i>	
Size: <u>Empln</u> , (natural log of) number of firm employees Full Time Equivalent	Istat-RS1
Age: (natural log of) number of years from firm establishment	Bureau Van <u>Dijk-Aida</u>
HQ: dummy for firms being the Headquarters	Istat-RS1
Sector: Hi-tech, medium-hi-tech, medium-low-tech, Low-tech, KIS, <u>L(ess)KIS</u> , Other	Istat-RS1
<u>Intcc</u> : Capital expenditures dummy for “Expenditure for machinery, equipment and software”	Istat-RS1
Approximate Total Factor Productivity ¹³	Bureau Van <u>Dijk-Aida</u>
Time dummies	Istat-RS1

Table 4 – The propensity of firms active in Italy to set up R&D cooperation with local partners (columns 1 and 2; non-MNEs as baseline; dependent: R&D cooperation with Italian partners) and with foreign partners (columns 3 and 4; non-MNEs as baseline; dependent: R&D cooperation with foreign partners)

VARIABLES	(1) R&D cooperation with local partners		(2) R&D cooperation with local partners		(3) R&D cooperation with foreign partners		(4) R&D cooperation with foreign partners	
	Coefficients	Marginal effects	Coefficients	Marginal effects	Coefficients	Marginal effects	Coefficients	Marginal effects
MN	0.176***	0.043***	0.112***	0.027***	0.269***	0.005***	0.155**	0.004**
	(0.042)	(0.010)	(0.041)	(0.010)	(0.061)	(0.001)	(0.060)	(0.002)
<u>IntraR&D</u>			0.143***	0.035***			0.226***	0.006***
			(0.014)	(0.003)			(0.021)	(0.001)
<u>R&DQuality</u>			0.515***	0.126***			0.808***	0.022***
			(0.046)	(0.011)			(0.071)	(0.003)
<u>ITregions</u>			0.143***	0.035***			0.096***	0.003***
			(0.024)	(0.006)			(0.029)	(0.001)
Constant	-1.453***		-2.225***		-3.046***		-4.074***	
	(0.191)		(0.194)		(0.289)		(0.294)	
Number of observations	31,170		31,170		31,170		31,170	

Size, age, capital expenditure, sector, productivity, headquarters controls and time dummies included;

standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 5 – Differences in the propensity of Domestic and Foreign MNEs to R&D cooperation with local counterparts (vs. non-MNEs as baseline; dependent: R&D cooperation with Italian partners) and with foreign partners (vs. non-MNEs as baseline; dependent: R&D cooperation with foreign partners)

VARIABLES	(1)		(2)		(3)		(4)	
	R&D cooperation with local partners		R&D cooperation with local partners		R&D cooperation with foreign partners		R&D cooperation with foreign partners	
	Coefficients	Marginal effects	Coefficients	Marginal effects	Coefficients	Marginal effects	Coefficients	Marginal effects
DMN	0.224***	0.055***	0.170***	0.042***	0.225***	0.004***	0.125	0.003
	(0.053)	(0.013)	(0.053)	(0.001)	(0.080)	(0.001)	(0.079)	(0.002)
FMN	0.114*	0.028*	0.038	0.009	0.317***	0.006***	0.187**	0.005**
	(0.060)	(0.015)	(0.059)	(0.014)	(0.082)	(0.002)	(0.081)	(0.002)
<u>IntraR&D</u>			0.143***	0.035***			0.226***	0.006***
			(0.014)	(0.003)			(0.021)	(0.001)
<u>R&DQuality</u>			0.517***	0.126***			0.807***	0.022***
			(0.046)	(0.011)			(0.071)	(0.003)
<u>ITregions</u>			0.143***	0.035***			0.096***	0.003***
			(0.024)	(0.006)			(0.029)	(0.001)
Constant	-1.451***		-2.223***		-3.051***		-4.077***	
	(0.191)		(0.194)		(0.289)		(0.294)	
Number of observations	31,170		31,170		31,170		31,170	

Size, age, capital expenditure, sector, productivity, headquarters controls and time dummies included;
 standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Conclusions

- MNEs may have direct and indirect effects on host economies
- Indirect effects are a combination of externalities and market stealing effects
- Linkages are among the most important channels through which knowledge (and pecuniary) externalities can be created
- MNEs propensity to linkage creation is associated to:
(1) technological advantages; (2) economies/diseconomies of common governance; and to (3) the experience of local contexts
- *Overall, Italian MNEs show a substantial advantage in technical linkage creation vis-a-vis foreign MNEs*
- *But FMN are better at world linkages*
- *Hence attracting FMN does not per se favour technical linkages locally, but they are a key window to world technology*



Thanks for your attention
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