

**Do FDI in Business Services “follow” FDI  
in Manufacturing?  
Evidence from Italian firm-level data**

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# The issues

- **Services are important for competitiveness; a large share of the output of business services sectors (telecommunication, IT or consulting) is used as intermediate input in manufacturing.**
- **Manufacturing firms use services to organize production, sell their output, manage their financial activities.**
- **Does the decision of manufacturing firms to relocate production in a foreign country (FDI) increase the probability that services suppliers also engage in FDI in the same foreign country?**
- **Does it make a difference whether there is a need of geographic proximity and “face to face” relations?**

# This paper investigates....

- **Location decisions to offshore services**
- **Whether the location choice model for manufacturing firms can be applied to (Italian) business services firms**
- **To which extent – if any- parameter estimates differ between services and manufacturing.**
- **Whether decisions to fragment production lead FDI in business services: the rationale being that while a manufacturing supplier does not have to follow its downstream customer after relocation (can indeed export), many services cannot easily be traded internationally**

# How?

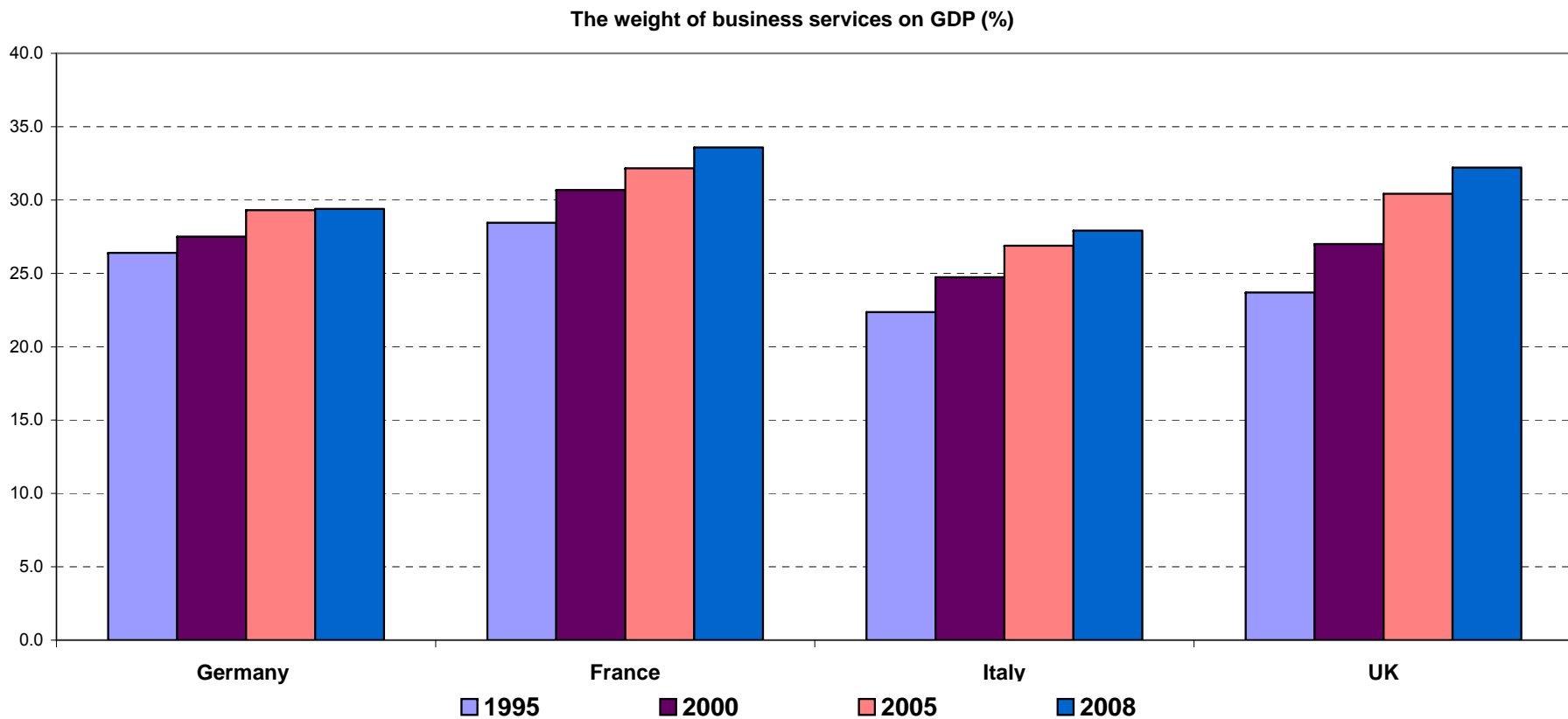
- **We fit (several) a discrete location choice models to a dataset of Italian multinationals (ICE-REPRINT database).**
- **We also test whether the location choices of manufacturing firms and business services are interdependent. In other words, if the probability of FDI in business services increases with an increase in the demand of Italian manufacturing affiliated.**
- **To do so, we need a proxy for the downstream demand of Italian manufacturing affiliates.**

# Summary of main results

- **The model explaining location choices of manufacturing firms also explains well location choices of services firms, with an important difference: FDI in manufacturing are cost saving (numerical value of GDP pro capita negative), FDI in business services go to high income countries**
- **The location choices of firms in manufacturing and services are not interdependent: the probability of FDI in business services does not increase with the downstream demand generated by FDI in manufacturing. (Is it because Italian manufacturing firms tend to privilege cost saving FDI?) [caution, possible simultaneity]**

# A look at data and descriptive statistics

**Business Services' weight over GDP increases everywhere, a dynamic sector which deserves attention**



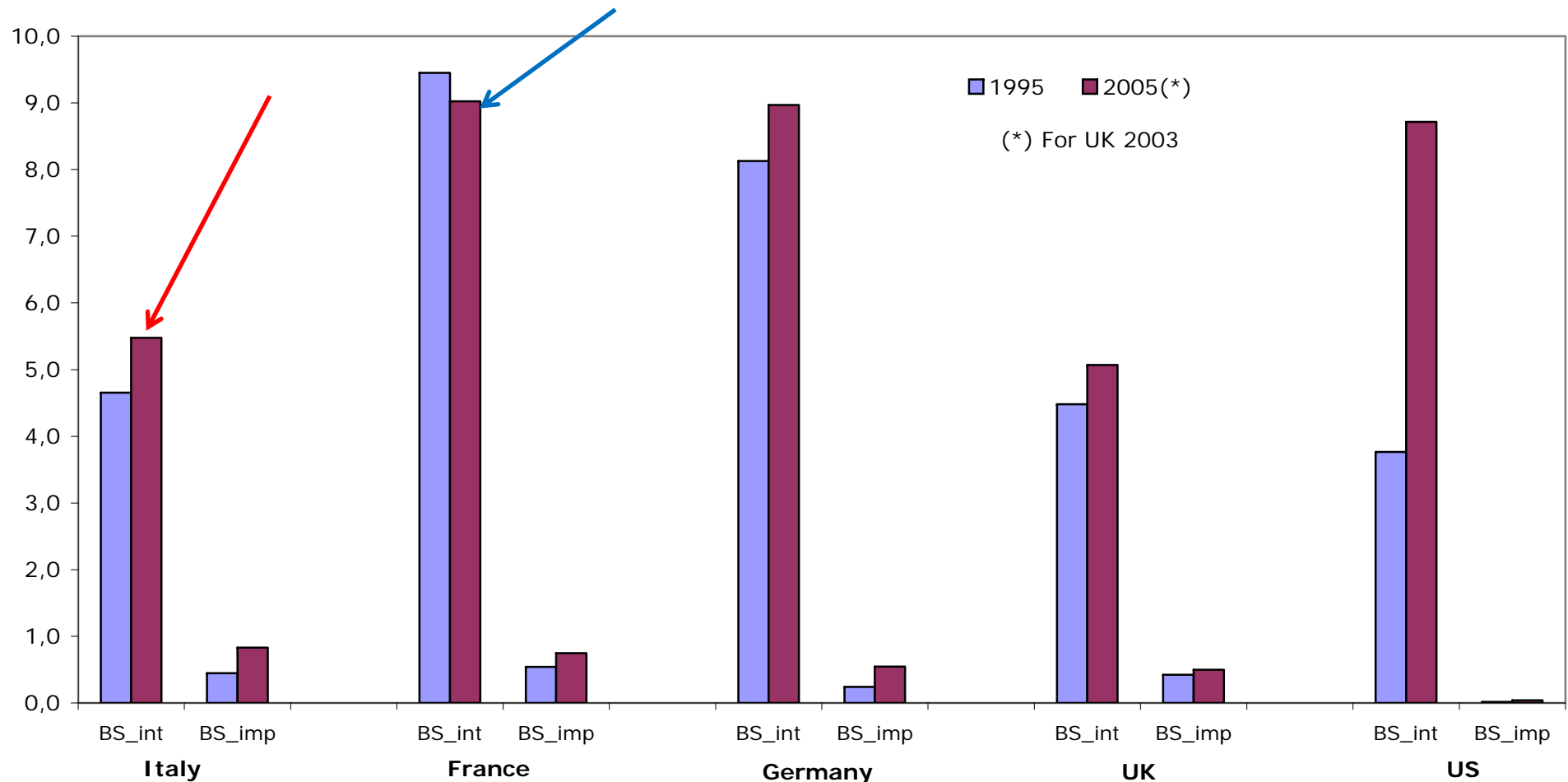
Fonte: Eurostat

Figure 1

# The BS weight as intermediate input in manufacturing production increases

Direct requirements coefficients of Business Services input from domestic production or imports in the Manufacturing branches

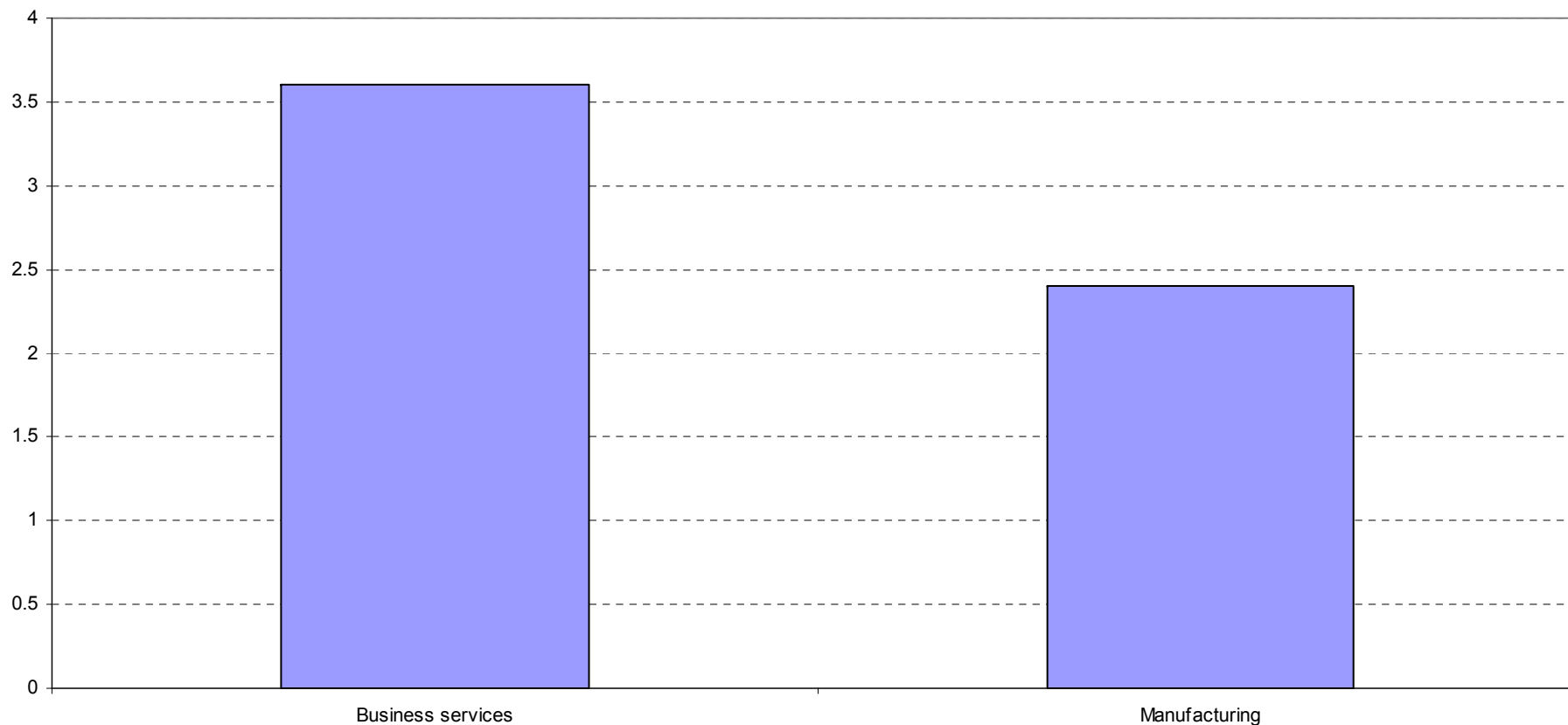
(for 100 euro of manufacturing output)



Source: Based in Oecd data

# In Italy, FDI in Business services grew at a higher rate than FDI in manufacturing

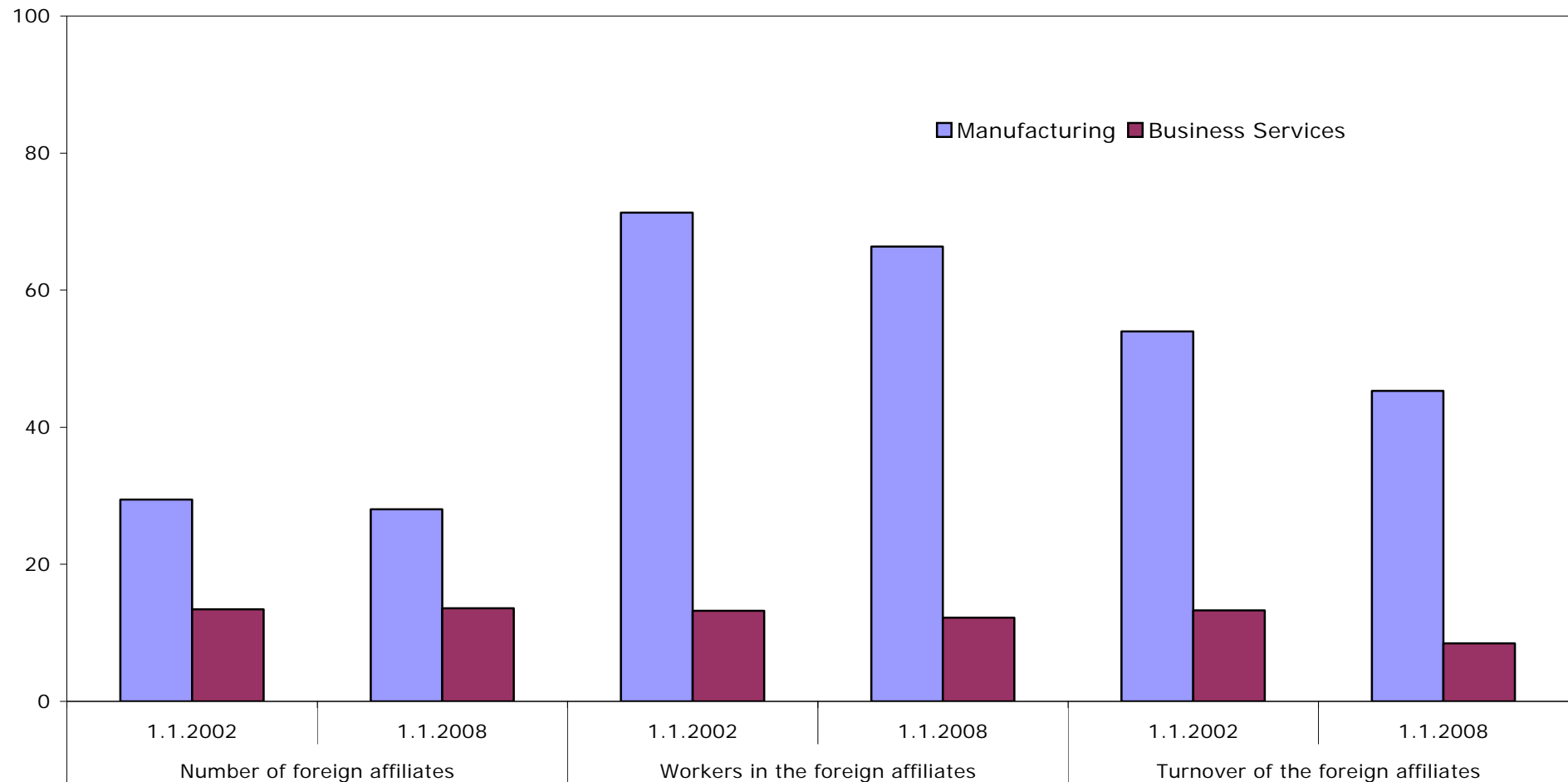
Compound annual growth rate of the number of the foreign affiliates  
(2008-2000)



Fonte: ICE - REPRINT

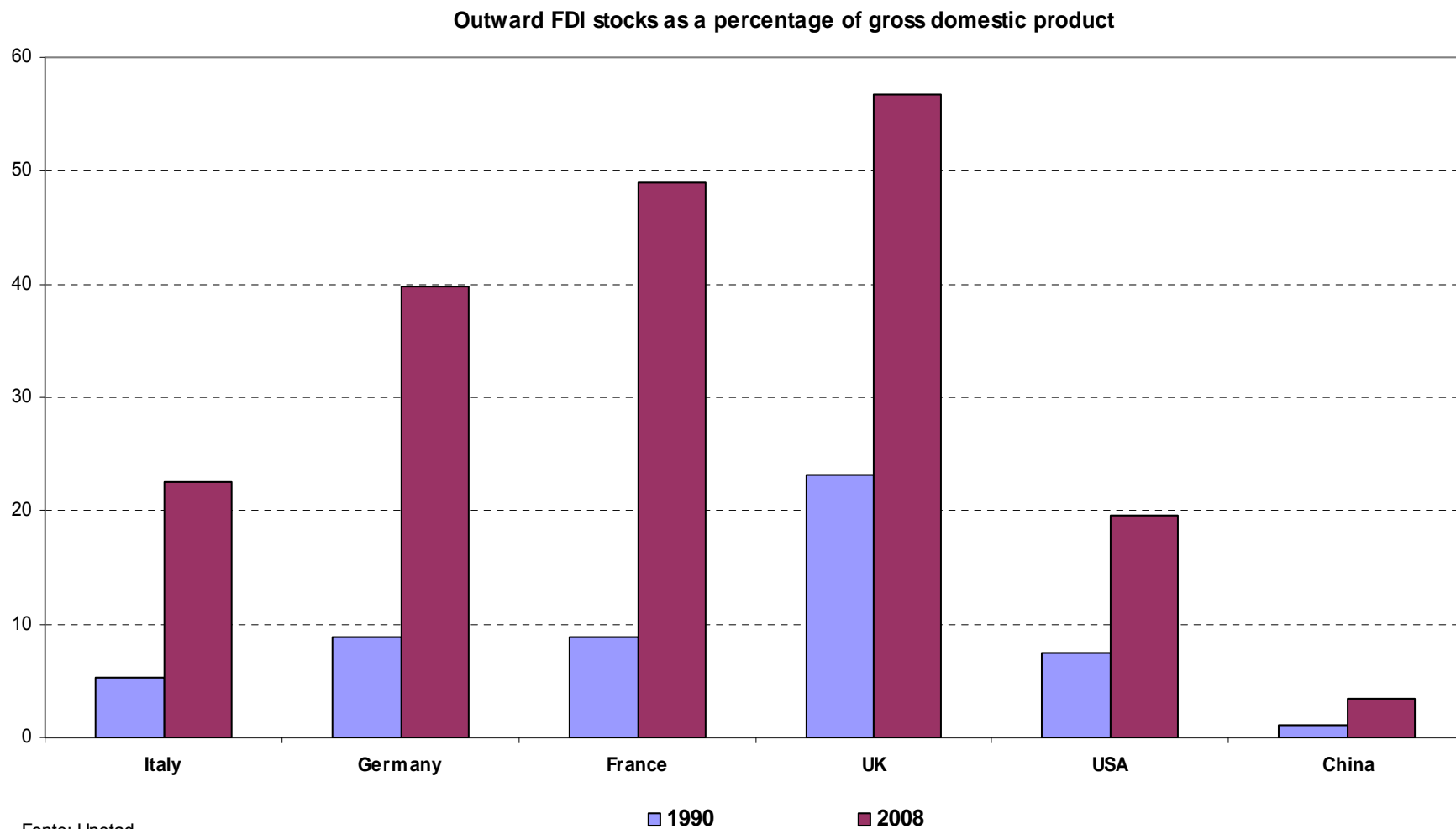
# Even though they remain scarce

Weight of manufacturing and of business services on the Italian foreign affiliates



Source: Based on Ice-Reprint data

# Despite recent increases, Italy lags behind



# Statistical description: Italian firms don't go too far...

Number of Foreign Affiliates by geographical composition

AREA DESTINAZ	Business services FDI			Manufacturing FDI		
	Freq.	Percent	Cum.	Freq.	Percent	Cum.
Central Asia	13	1,98	1,98	82	2,75	17,21
North Africa	11	1,68	3,66	94	3,15	4,66
Sub-saharan Africa	4	0,61	4,27	45	1,51	1,51
Latin America	78	11,91	16,18	292	9,8	14,46
North America	63	9,62	25,8	216	7,25	63,56
East Asia	24	3,66	29,47	356	11,95	29,16
Eastern Europe	96	14,66	44,12	747	25,07	54,23
Middle East	5	0,76	44,89	62	2,08	56,31
Oceania	6	0,92	45,8	35	1,17	64,73
EU + EFTA	355	54,2	100	1.051	35,27	100
<b>Total</b>	<b>655</b>	<b>100</b>		<b>2.980</b>	<b>100</b>	

# Which type of business service?

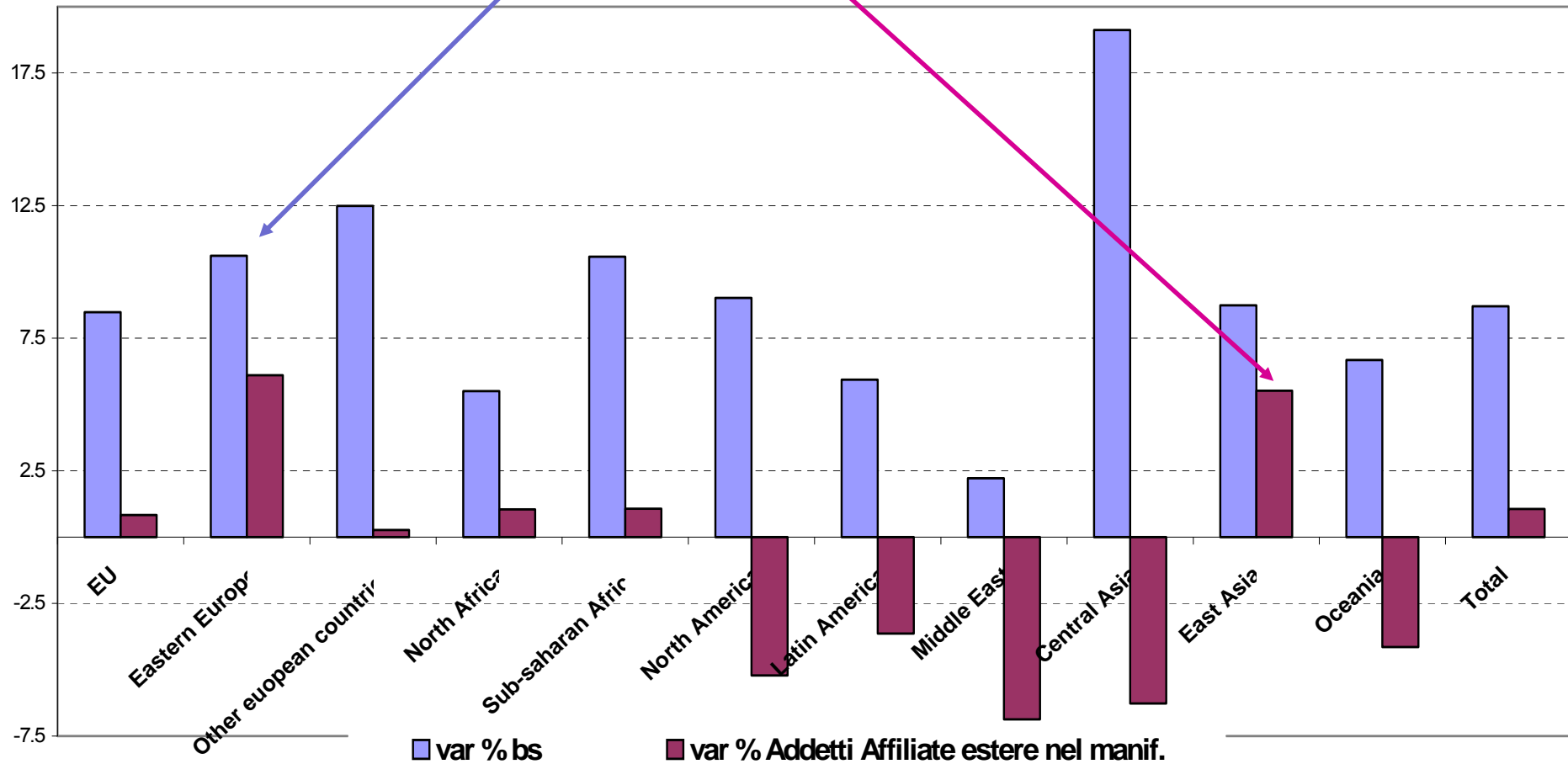
Business services fdi by subsector

	INFO/R&D/SOFT	INGE/SERP	LOGI/NOLE	TLC	total
1995	1	7	9	4	21
1996	2	7	5	1	15
1997	1	6	6	2	15
1998	4	11	6	16	37
1999	13	35	9	4	61
2000	27	48	9	54	138
2001	26	62	16	42	146
2002	26	32	12	4	74
2003	12	35	10	14	71
2004	10	7	10	1	28
2005	15	17	9	8	49
total	137	267	101	150	655

# Business services and manufacturing

% changes, Annual averages in FDI in business services and employees in manufacturing

Addetti nelle affiliate estere nel manifatturiero e numero di investimenti produttivi nei BS (variazione media annua)



Fonte: ns elaborazioni su dati ICE - Reprint

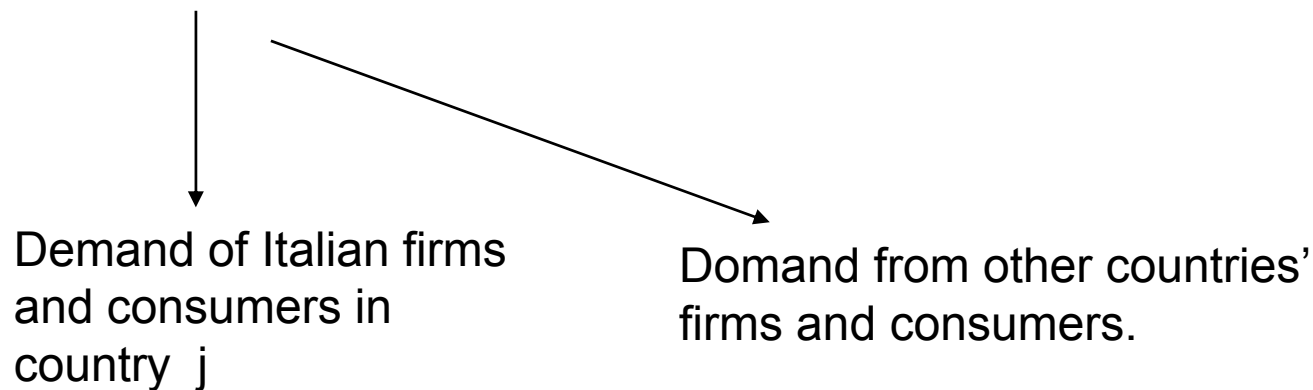
Figure 2

# The econometric model: a gravity model

$$\Pi_{ij} = \beta_0 + \beta_1 \text{distance} + \beta_2 c_{ij} + \beta_3 mp_{ij}$$

Where

- $\Pi_{ij}$  = profits of foreign affiliate (affiliate of a firm of country  $i$  investing in country  $j$ )
- $c_{ij}$  = marginal costs
- $mp_{ij}$  = potential market of country  $j$  affiliate



# The econometric model: from theory to implementation

$$\Pi_{ij} = \beta_0 + \beta_1 c_{ij} + \beta_2 mp_{ij} + \gamma dd_{ij}$$

- $c_{ij}$  = per capita GDP + geographical distance+ language + cultural proximity + borders;
- $mp_{ij}$  = weighted average of all markets consumptions (Head e Mayer 2004), where weight are given by market access and competition level;
- $dd_{ij}$  = downstream demand

$$dd_j = \frac{\beta^b}{\tau_{jj}} \sum_{m=1}^M s^m y_j^m$$

- $\beta^b$  = share of business services output used as intermediate input in other sectors;
- $a^m$  = share of manufacturing  $m$  on intermediate demand of business services;
- $y^m$  =output of manufacturing sector  $m$ ; proxied by employment because of lack of data

# A (new) indicator for the downstream demand

We propose a correction of the indicator for the downstream demand (cf. Nefussi-Schwellnus)

We measure the downstream demand of Italian manufacturing affiliates for every host country, combining detailed information on production and sectors of the Italian firm-level data with Italian input-output tables.

**Our indicator:**

$$dd_j = \frac{\beta^b}{\tau_{jj}} \sum_{m=1}^M s^m y_j^m$$

where “ $\beta$ ” is the share of business services output that is used as intermediate input in other sectors, “ $s$ ” is the share of manufacturing sector  $m$  in intermediate demand for business services, and  $y$  is output of manufacturing sector  $m$  in country  $i$ . The coefficients “ $\beta$ ” and “ $s$ ” are obtained for every year from input-output tables.  $\tau$  is the internal distance

# Data sources

- Dependent variable: having done a FDI (ICE-Reprint)
  - 2980 manufacturing investments, 1995-2005
  - 655 business services investments (Business services, logistic, engeneering, telecommunications, Software, R&D) 1995-2005
- Explanatory variables:
  - GDP per capita: World development indicators
  - Trade cost: Cepii
  - $dd_{ij}$  = input output tables data + employment (lagged value to avoid simultaneity issues) [constructed, different motivation]
  - NB: in the construction of  $dd_{ij}$ , input-output data are Istat and employment data are from ICE-Reprint

# The background: the estimation Results for manufacturing

Dependent Variable: FDI Location choice in manufacturing

Negative significant



	<i>no</i>	<i>no</i>	<i>no</i>	<i>si</i>	<i>si</i>	<i>si</i>
<b>Ln_distance</b>	-0.302 (0.02)***	-0.775 (0.03)***	-0.7694 (0.03)	-0.269 (0.03)***	-0.7864 (0.03)***	-0.785 (0.03)***
<b>Common Border</b>	0.418 (0.09)***	0.344 (0.0811)***	0.467 (0.08)***	0.207 (0.08)***	0.421 (0.08)***	0.516 (0.08)***
<b>Ln_gdp_procapite</b>	-0.051 (0.03)*	-0.177 (0.03)***	-0.173 (0.03)***	-0.056 (0.02)***	-0.077 (0.0330)***	-0.079 (0.0331)***
<b>Ln_Market Potential</b>	0.247 (0.01)***	0.632 (0.03)***	0.604 (0.03)***	0.156 (0.02)***	0.697 (0.0297)***	0.667 (0.0302)***
<b>Ln_area</b>		0.5794 (0.02)***	0.556 (0.02)***		0.604 (0.02)***	0.582 (0.02)***
<b>Landlocked</b>			-0.513 (0.1)***			-0.479 (0.1)***
<b>Dummy OECD</b>	<i>no</i>	<i>no</i>	<i>no</i>	<i>si</i>	<i>si</i>	<i>si</i>
Number of obs	165432	165432	165432	165432	165432	165432
Pseudo R2	0.04	0.13	0.14	0.05	0.14	0.14

N.B: dummy OECD is a dummy for high income countries; in the brackets there are standard errors; \* p<0.05; \*\* p<0.01;\*\*\* p<0.001

Table 1a

# Estimation Results: Business Services

Location choice probabilities in services decrease with distance, increase with cultural proximity, a shared border and market potential

Dependent Variable: FDI Localization choice in Business Services

	<i>no</i>	<i>no</i>	<i>no</i>	<i>si</i>	<i>si</i>	<i>si</i>
<b>Ln_distance</b>	-0.3623 (0.05)***	-0.7629 (0.06)***	-0.762 (0.06)***	-0.267 (0.05)***	-0.752 (0.06)***	-0.752 (0.06)***
<b>Common Border</b>	0.348 (0.13)***	0.343 (0.13)***	0.471 (0.13)***	0.473 (0.13)***	0.353 (0.13)***	0.471 (0.13)***
<b>Ln_gdp_procapite</b>	0.5545 (0.05)***	0.2473 (0.05)***	0.254 (0.051)***	0.208 (0.05)***	0.199 (0.05)***	0.215 (0.05)***
<b>Ln_Market Potential</b>	0.2013 (0.03)***	0.587 (0.03)***	0.586 (0.05)***	0.177 (0.05)***	0.587 (0.05)***	0.567 (0.05)***
<b>Ln_area</b>		0.587 (0.03)***	0.565 (0.03)***		0.57 (0.03)***	0.553 (0.03)***
<b>Landlocked</b>			-0.494 (0.1770)**			-0.466 (0.18)**
<b>Dummy OECD</b>	<i>no</i>	<i>no</i>	<i>no</i>	<i>si</i>	<i>si</i>	<i>si</i>
Number of obs	90879	90879	90879	90879	90879	90879
Pseudo R2	0.1542	0.2478	0.2492	0.1831	0.2482	0.2495

N.B: dummy OECD is a dummy for high income countries; in the brackets there are standard errors; \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$

Table 1b

Positive and significant

# The role of downstream demand: not clear-cut results

Dependent Variable: FDI choice in business services												
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Ln_distance	-0.5 (0.06)***	-0.551 (0.06)***	-0.275 (0.07)***	-0.364 (0.07)***	-0.511 (0.06)***	-0.561 (0.06)***	-0.282 (0.07)***	-0.371 (0.07)***	-0.42 (0.05)***	-0.47 (0.05)***	-0.31 (0.07)***	-0.42 (0.07)***
Common Border	0.796 (0.13)***	1.267 (0.14)***	0.517 (0.14)***	0.899 (0.14)***	0.789 (0.13)***	1.265 (0.14)***	0.509 (0.14)***	0.895 (0.14)***	0.83 (0.13)***	1.26 (0.14)***	0.14 (0.14)	0.76 (0.14)***
Ln_gdp_procapite	0.128 (0.05)*	0.221 (0.05)***	0.172 (0.06)**	0.226 (0.06)***	0.128 (0.05)*	0.222 (0.05)***	0.17 (0.06)**	0.225 (0.06)***	0.13 (0.05)***	0.22 (0.05)***	0.21 (0.06)***	0.28 (0.06)***
Ln_potential market	0.53 (0.03)***	0.512 (0.03)***	0.261 (0.04)***	0.253 (0.04)***	0.538 (0.03)***	0.519 (0.03)***	0.264 (0.04)***	0.256 (0.04)***	0.45 (0.03)***	0.44 (0.03)***	0.26 (0.04)***	0.22 (0.04)***
landlocked		-1.344 (0.18)***		-1.144 (0.19)***		-1.348 (0.18)***		-1.146 (0.19)***				-1.48 (0.19)***
Ln_downstream demand_NF	-0.063 (0.03)*	-0.078 (0.03)*	-0.024 (0.04)	-0.062 (0.04)								
Ln_downstream demand_cing_addetti					-0.079 (0.03)*	-0.092 (0.03)**	-0.032 (0.04)	-0.069 (0.04)				
Ln_downstream demand_cing_fatturato									0.07 (0.03)**	0.05 (0.03)*	-0.05 (0.03)	-0.09 (0.04)
Dummy_OECD	no	no	si	si	no	no	si	si	no	no	si	si
Observations	82034	82034	82034	82034	82034	82034	82034	82034	82034	82034	82034	82034
Pseudo R2	0.13	0.15	0.13	0.14	0.1366	0.1498	0.15	0.16	0.14	0.15	0.19	0.2

N.B: per dummy OECD si intende la dummy per gli high income countries; tra parentesi vi sono gli standard error; \* p<0.05; \*\* p<0.01; \*\*\* p<0.001

table 2

# Downstream Demand of manufacturing firms activates FDI in telecommunications

Variabile dipendente: Localizzazione investimento

	TLC		SERP&INGE		NOLE&LOGI		SOFT&INFO	
	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
Ln_lag_dd_tlc_L	0.10 (0.0623)*	0.08 (0.0628)	-0.08 (0.0447)**	-0.09 (0.0445)**	-0.11 (0.0931)	-0.11 (0.0925)	-0.15 (0.0652)**	-0.17 (0.0662)***
Ln_distance	-0.13 (0.1133)	-0.19 (0.1154)*	-0.40 (0.0901)***	-0.44 (0.0911)***	-1.01 (0.1969)***	-1.03 (0.1967)***	-0.35 (0.1367)***	-0.43 (0.1416)***
Contiguity	0.73 (0.2623)***	1.29 (0.2689)***	0.20 (0.2219)	0.61 (0.2382)***	-0.11 (0.4206)	0.13 (0.4458)	0.39 (0.3019)	1.10 (0.3084)***
Ln_gdp_procapite	0.73 (0.1035)***	0.72 (0.1055)***	0.56 (0.0743)***	0.54 (0.0748)***	0.30 (0.1497)**	0.28 (0.1494)**	0.87 (0.1309)***	0.89 (0.1360)***
Ln_mp_hm	0.10 (0.0715)*	0.10 (0.0719)*	0.23 (0.0574)***	0.23 (0.0573)***	0.18 (0.1328)	0.18 (0.1317)	0.32 (0.0818)***	0.33 (0.0825)***
Landlocked		-1.59 (0.3990)***		-0.95 (0.2804)***		-0.54 (0.4173)		-1.78 (0.4742)***
Observations	20964	20964	34605	34605	9397	9397	16912	16912
Pseudo R2	0.18	0.19	0.15	0.16	0.14	0.14	0.23	0.25

Legal services, logistic, engineering: local knowledge seems to be more important

# Conclusions

- The parameter estimates of a gravity type of model for services are fairly close to the ones in manufacturing (same as Nefussi and Schwellnus, 2007).
- However the underlying logic behind FDI in business services could be slightly different, since there are significant differences in the coefficient of per capita GDP (different sign).
- Development level of destination countries matters. Per capita GDP negatively affects FDI in manufacturing, and positively FDI in services. The probability that FDI in manufacturing goes where wages are lower is very high; in services workers have higher skills; higher per capita income implies higher skills workers

# Conclusions, 2

- We check whether similarity in estimated parameters for manufacturing and services is due to a complementarity, under the assumption that manufacturing location choices influences location choices in services. Descriptive statistics show that for business services sector input-output linkages with the manufacturing sector are particularly strong.
- The downstream demand of Italian manufacturing affiliates does not have a positive effect on the location choice probabilities of Italian business services affiliates (a part from telecommunication). (different from Nefussi).
- Due to characteristics of Italian international firms (is there a threshold level?)

**Thanks!**