



# COUNTRY SPECIALISATION REPORT

Country: Italy

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## COUNTRY SPECIALISATION REPORT - ITALY

### MAIN FINDINGS

Overall Italy is better placed on the low-to-medium technology sectors in both manufacturing and services, while there is low correlation between business R&D and technological and economic specialisation.

No significant changes have been observed in R&D spending during the last 10 years in Italy. R&D intensity has remained roughly stable for the last 10 years (GERD grew from 1.13% of GDP in 1993 to 1.16% in 2003) (figure 1). HERD remained also constant at 0.3% of GDP till 2000 and then grew to 0.4%. Similarly, financing sources remained unchanged<sup>1</sup>. The business sector remains a marginal contributor (around 1%) to government R&D expenditures (Table 1), while Government funding accounts for approximately 14% of BERD. GERD is directed toward applied research and experimental development while basic research represents 20%.

GBAORD by socioeconomic objective is strong in the area of human health and space where productivity and quality of outputs, measured by publications and citations (figures 9 to 11), are high in comparison with Europe (figure 3). Other areas of strength are GUF's, Industry, Energy and Earth. The relevant concentration of government funding on aerospace, health and industry is also reflected on government funding of business expenditures on R&D which represent more than 12% of BERD. Among the sectors, aerospace attracts the highest share amounting to 29% of the total government funding, while Pharmaceuticals is at the sixth position with 4.3%. Although scientific specialisation (expressed by Bibliometrics) is compatible with government funding, it does not fit with BERD and industrial specialisation (compare figure 9 with 6 and 14).

Specialisation of BERD has changed over the last 10 years with many sectors attracting private investments on R&D (figure 6). The trend is more apparent in services, where other business activities, financial intermediation, hotels and trade have changed from non-specialised to specialised. In manufacturing this change is observed in low-to-medium and medium-to-high tech sectors with the exception of instruments (examples are textiles, wood, food, furniture and other machinery). In three high-tech sectors Italy retains its specialisation, namely pharmaceuticals, aerospace and R&D while it loses specialisation in motor vehicles where Italy has strong tradition. On the contrary, marginal changes are observed in technological specialisation where specialisation in low-to-medium technology sectors (e.g. furniture, wood and publishing, furniture, food, metal and non-metal) is retained. On the other side of the spectrum Italy remains non-specialised in all high-technology sectors (except chemicals), such as Pharmaceuticals (despite the scientific specialisation), office machinery, instruments electrical equipment etc despite the high concentration of patents in these areas (see figures 12 and 13).

Economic specialisation of Italy as it is expressed by value added and export specialisation is characterised by the domination of low-to-medium technology sectors such as furniture, textiles and apparel, while it retains a leading position in design, agriculture, fabricated metal and non-metal products (figures 14 to 18). In the transport sector Italy is non-specialised in motor vehicle despite its long tradition while it is specialised in shipping due to its dominating position in boats for leisure. From the high-tech sectors only pharmaceuticals retain a marginal specialisation.

Similarly in services, Italy is specialised in the relatively low-tech part of the spectrum namely in hotels, trade and financial intermediation.

Comparing specialisation of business R&D with technological and economic specialisation the low correlation is apparent (Table 2). Only technological specialisation is strongly correlated with economic specialisation. More specifically, the strongest correlations exist between patents and exports meaning that technological position is strongly related to the competitive position of the Italian Industry.

Comparing the position of sectors, only transport none elsewhere classified, machinery, hotels trade and financial intermediation are specialised in both BERD and value added. Plastics is marginally non-specialised on BERD while along with textiles and machinery it is specialised on all other metrics value added, patents and exports.

### MAIN R&D FIGURES – TOTAL R&D EXPENDITURE

Figure 1. R&D expenditure by performing sector as per cent of GDP (left axis). GDP in million Euros (right axis).Italy. 1993-2003.

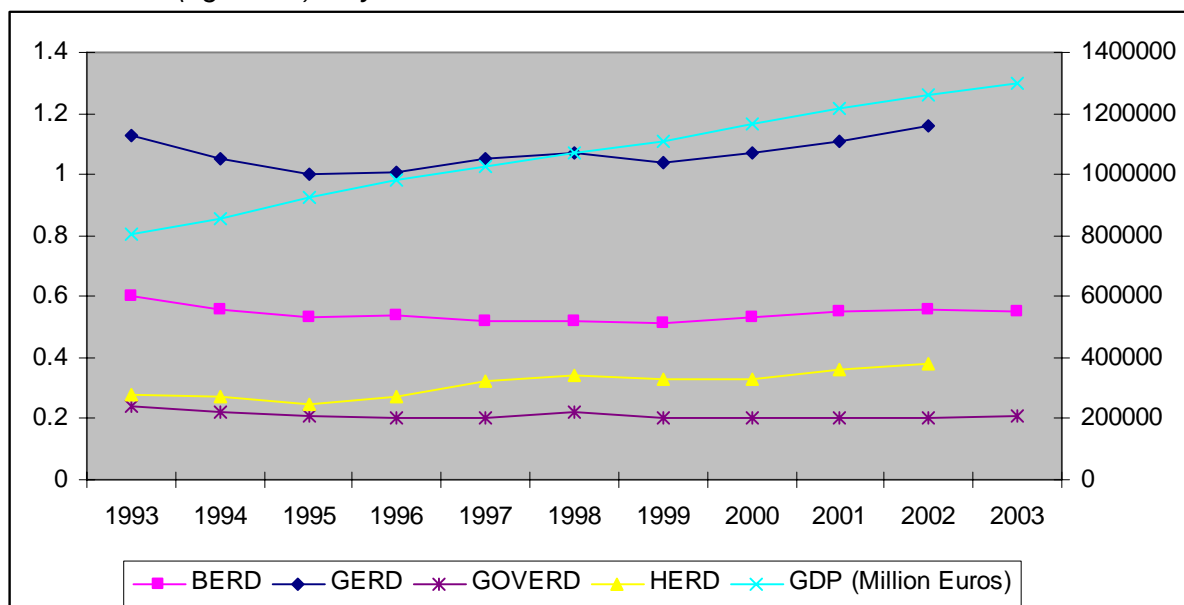


Table 1. R&D expenditure by sector of performance and source of funds .Italy. 1997 and 2003. Million Euros. 2000 prices.

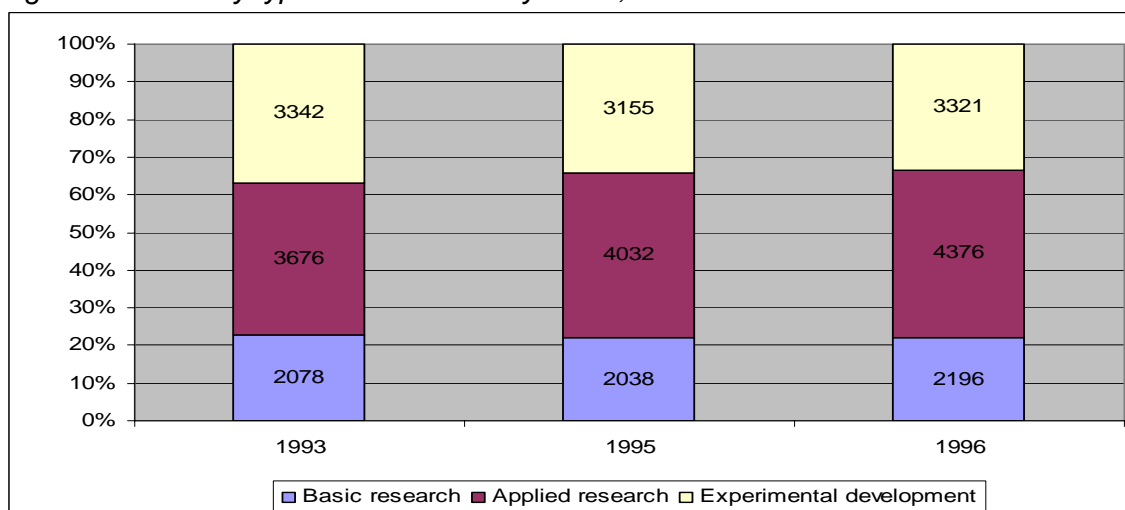
	GOVERD		BERD		Non profit		Total	
	1997	2003	1997	2003	1997	2003	1997*	2003**
Business	31	28	4,442	4,877		18	4,473	4,923
Government	2,082	2,186	751	904		69	2,833	3,159
Higher Education	2	2	0	0		1	2	3
Non profit	60	40	23	6		92	83	138
From Abroad	56	116	516	615		11	572	742
Total	2,232	2,373	5,732	6,403		191	7,964	8,967

\* HERD and Non-Profit are not included

\*\* HERD is not included

Source: ISTAT (National Italian Bureau of Statistics), taken from Baseload Inventory, Country Report of Italy

Figure 2. GERD by type of research. Italy. 1993,1995 and 1996

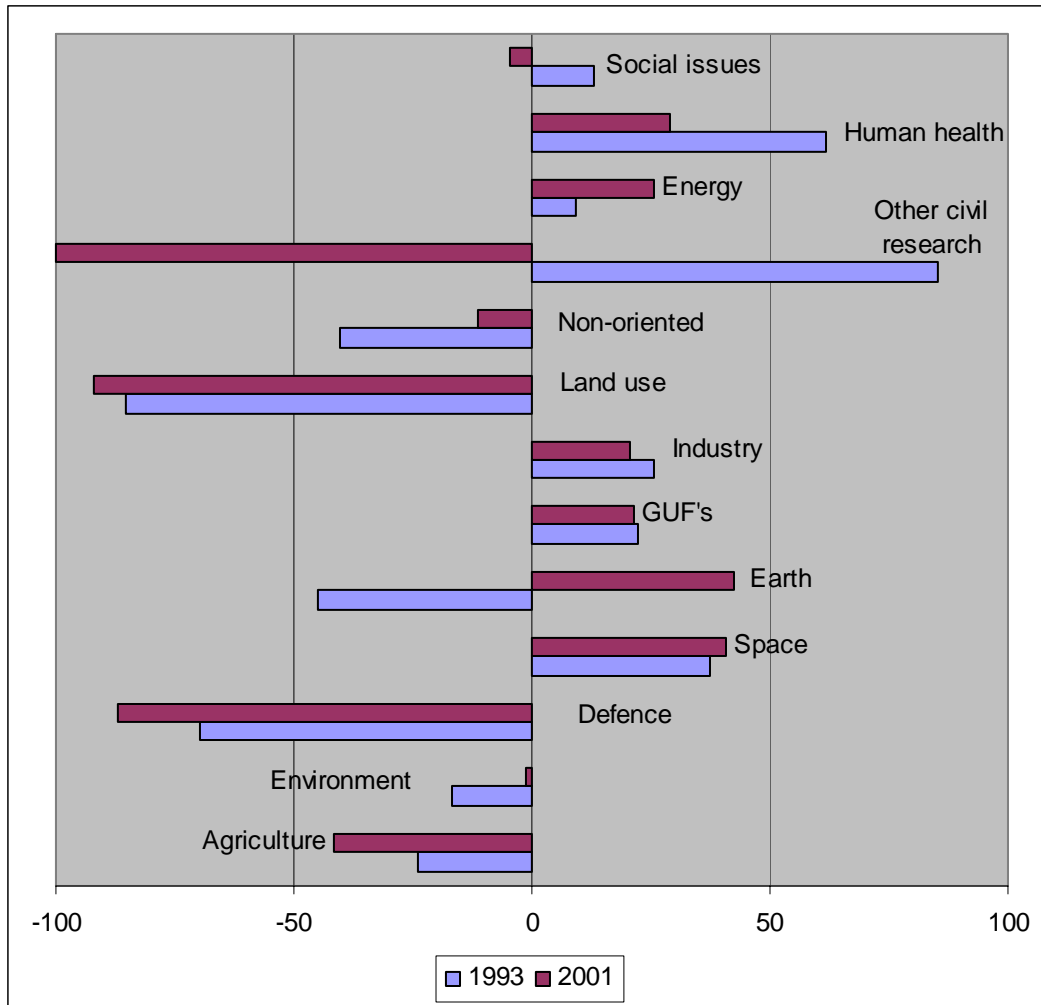


Source: OECD OFFBERD 2005

**PUBLIC R&D STATISTICS**

**GBAORD by socioeconomic objective**

Figure 3. Government Budget Appropriations or Outlays for R&D (GBAORD) by socioeconomic objective. Specialisation profile. Italy. 1993 and 2001.



Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100.  
 Source: OECD Basic Science and Technology Statistics 2005, own calculations.



**HERD by field of science**

*Figure 4. Expenditure on R&D in the Higher Education Sector (HERD) by field of science. Italy. 1993, 1998 and 2002. Per cent of total HERD and in million Euro.*

**Not available**

*Source: OECD Basic Science and Technology Statistics 2005.*

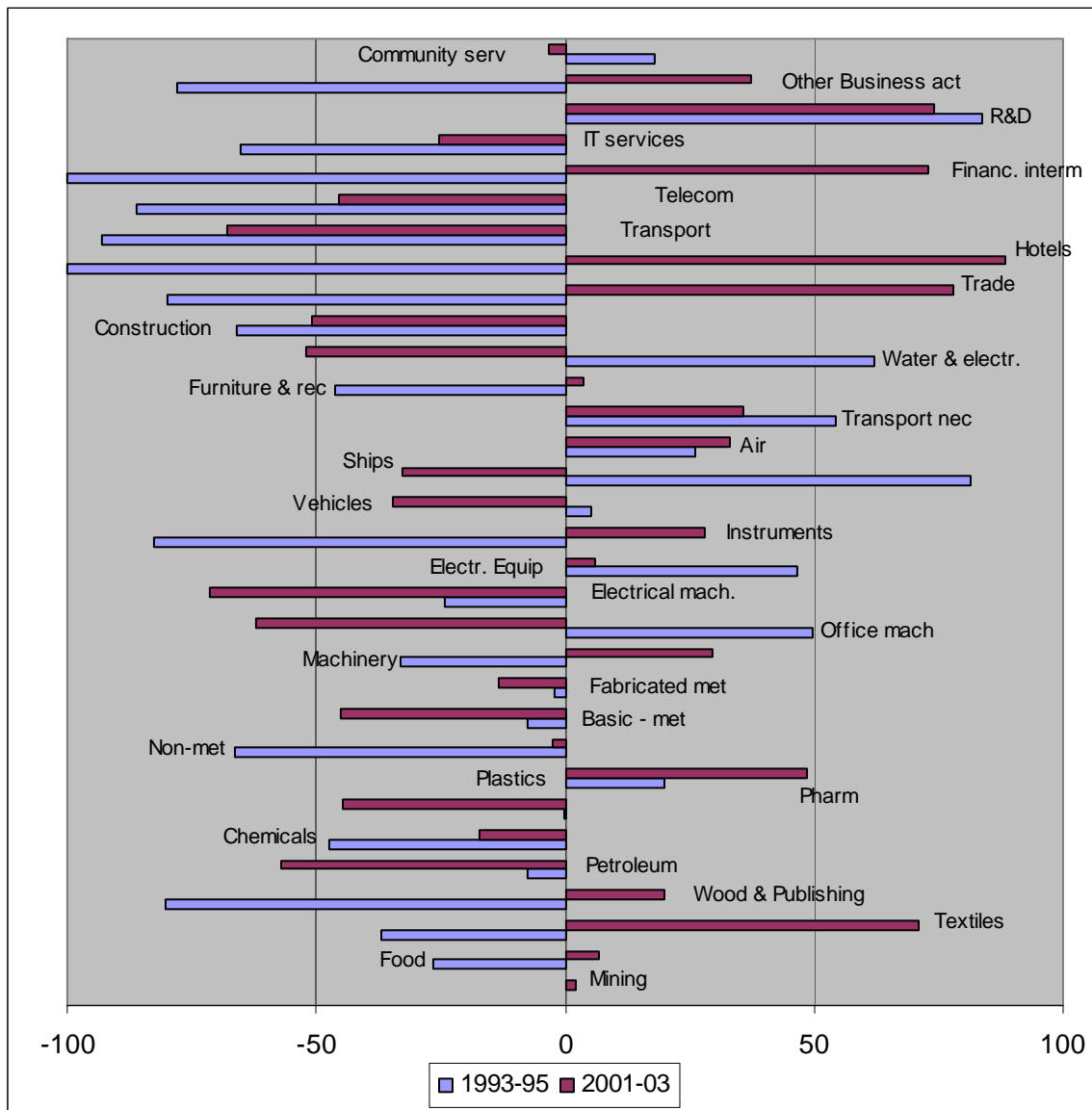
*Figure 5. Expenditure on R&D in the Government sector (GOVERD) by field of science. Specialisation profile. Italy. 1993, 1998 and 2002.*

**Not available**

*Source: OECD Basic Science and Technology Statistics 2005*

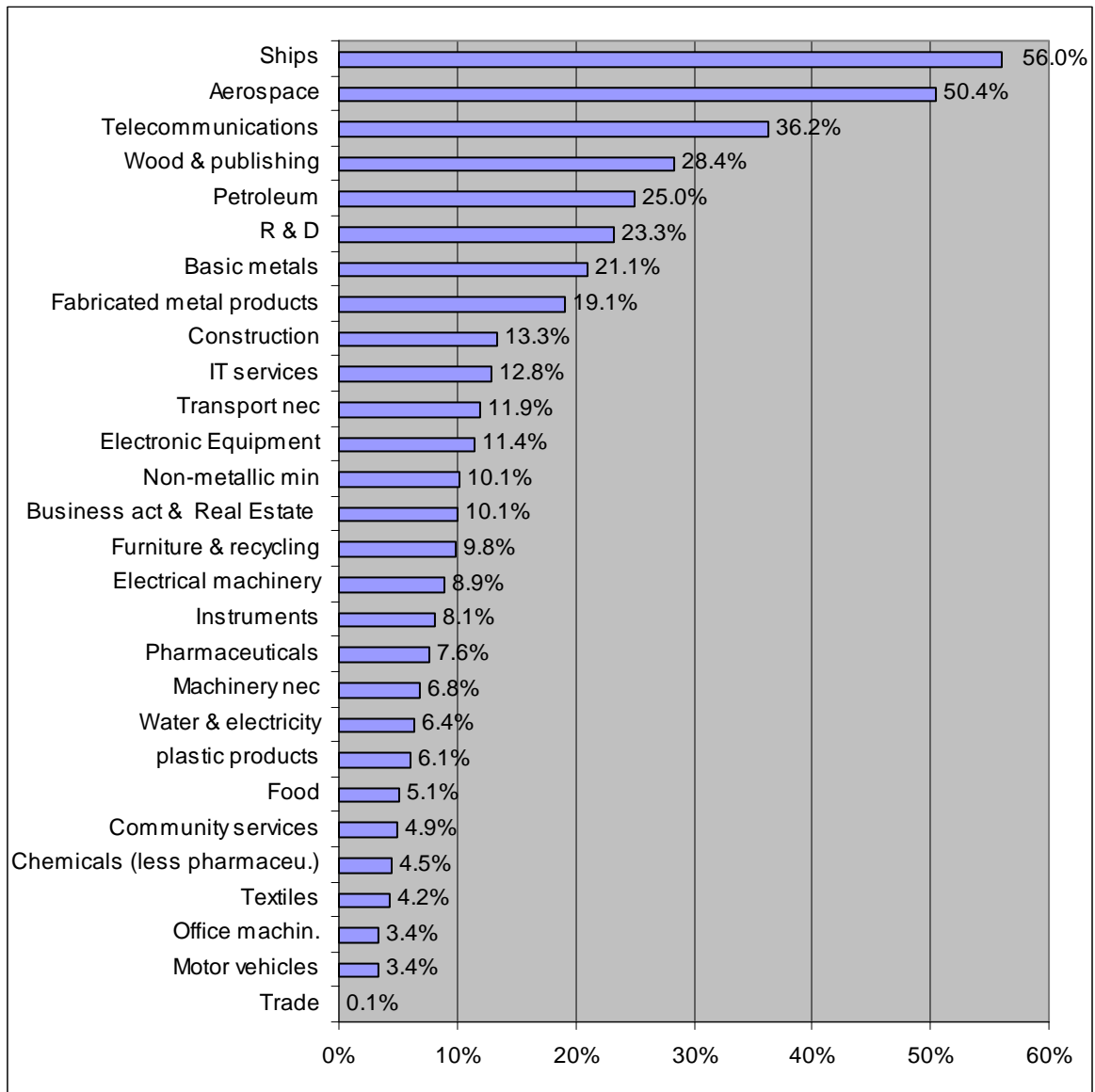
**BUSINESS ENTERPRISE INTRAMURAL EXPENDITURE ON R&D (BERD)**

Figure 6. Business enterprise intramural expenditure on R&D by industrial sector. 31 sectors. Specialisation profile. Italy. Averages 1993-1995 and 2001-2003.



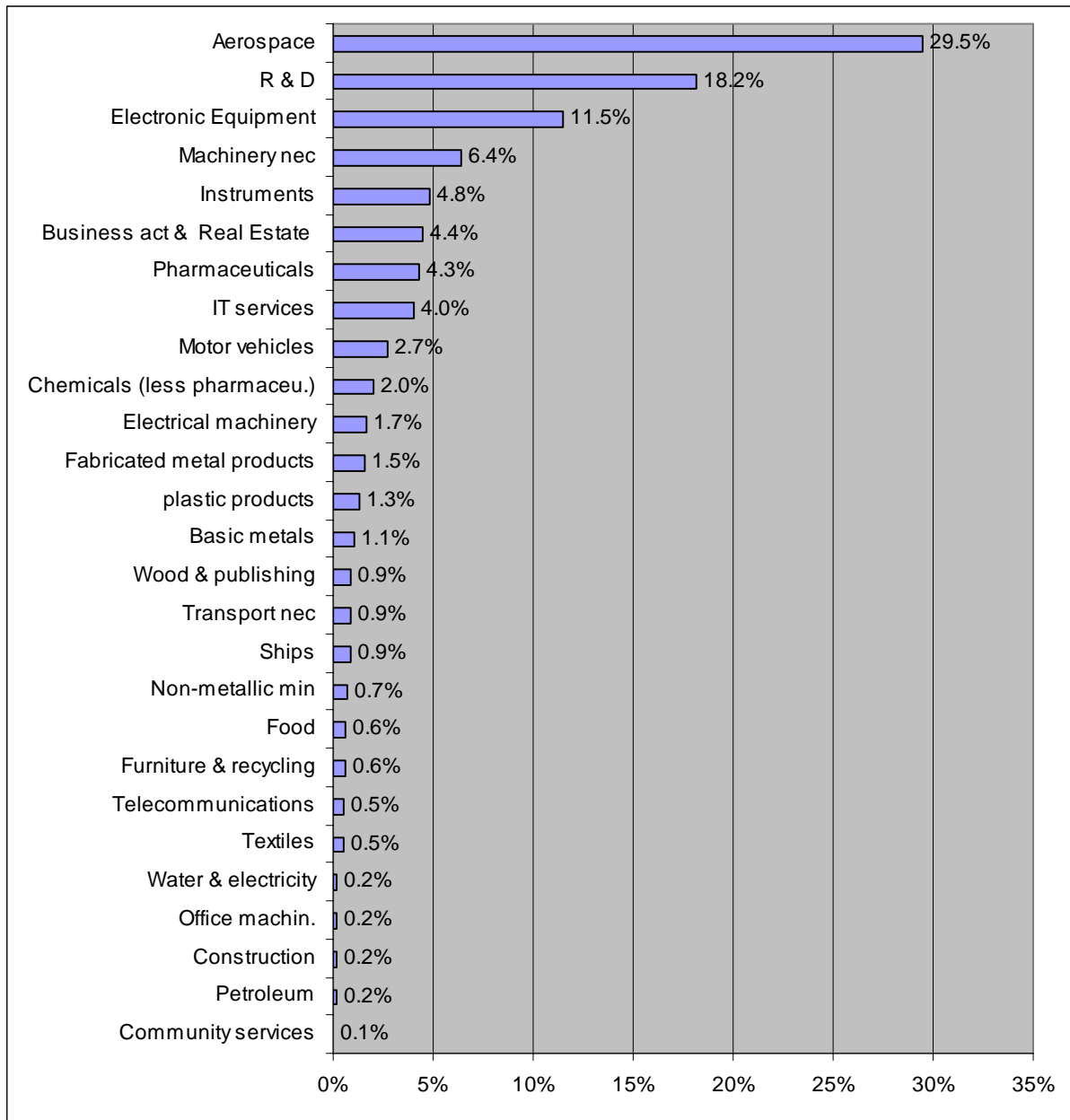
Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100.  
 Source: OECD Basic Science and Technology Statistics 20052005, ANBERD 2005, own calculations

Figure 7. Shares of Business enterprise intramural expenditure on R&D (BERD) in the sectors funded by government. 2002 last available year in OECD statistics.



Source:OECD Basic Science and Technology Statistics 2005, own calculations

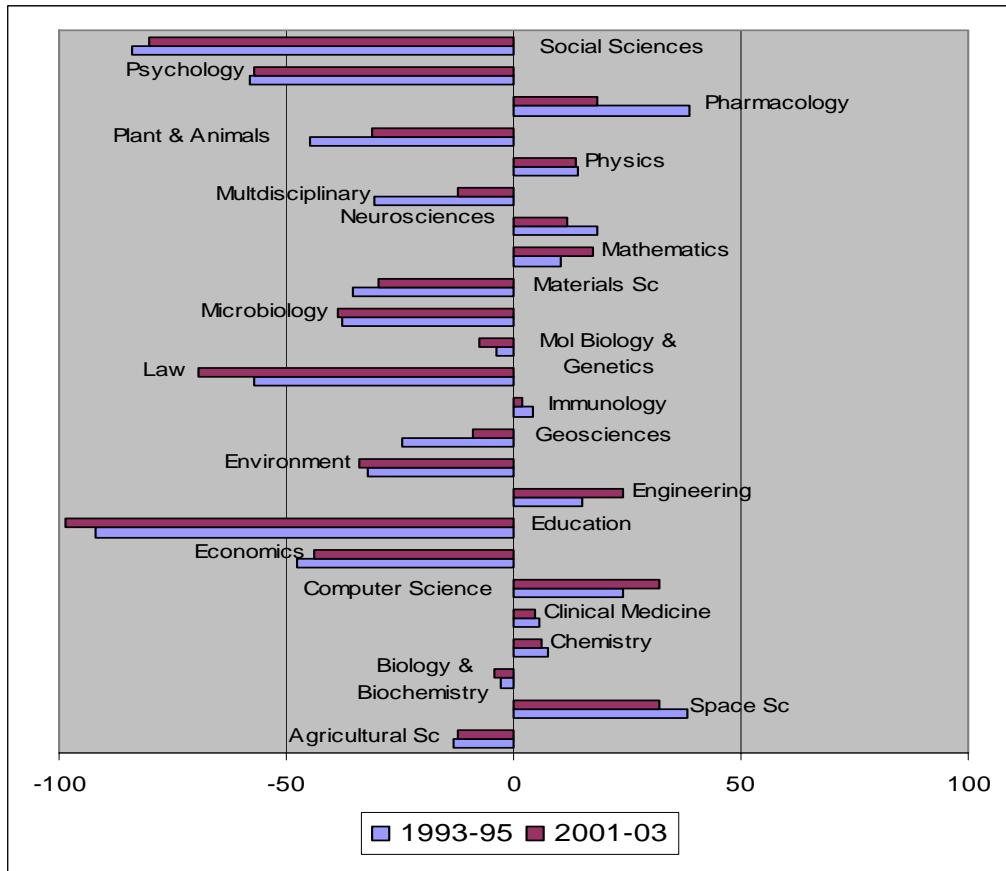
Figure 8. Shares of total government funding of Business enterprise intramural expenditure on R&D (BERD) by industrial sectors. 2002 last available year in OECD statistics.



Source: OECD Basic Science and Technology Statistics 2005, own calculations

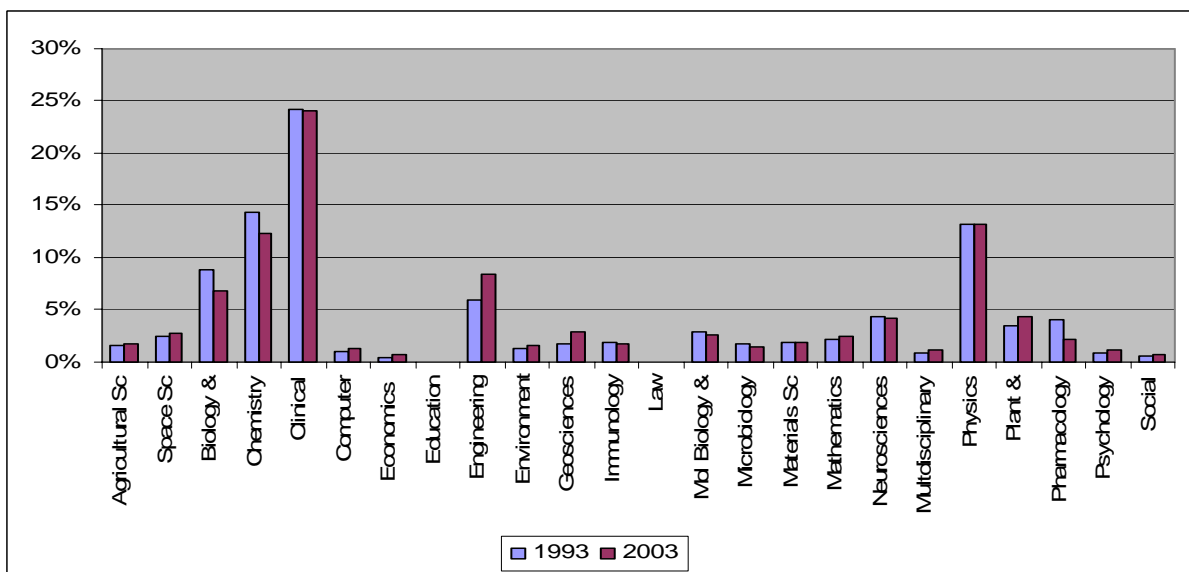
**BIBLIOMETRICS**

Figure 9. Number of publications by scientific field. 25 Scientific fields. Specialisation profile. Italy. Averages 1993-1995 and 2001-2003.



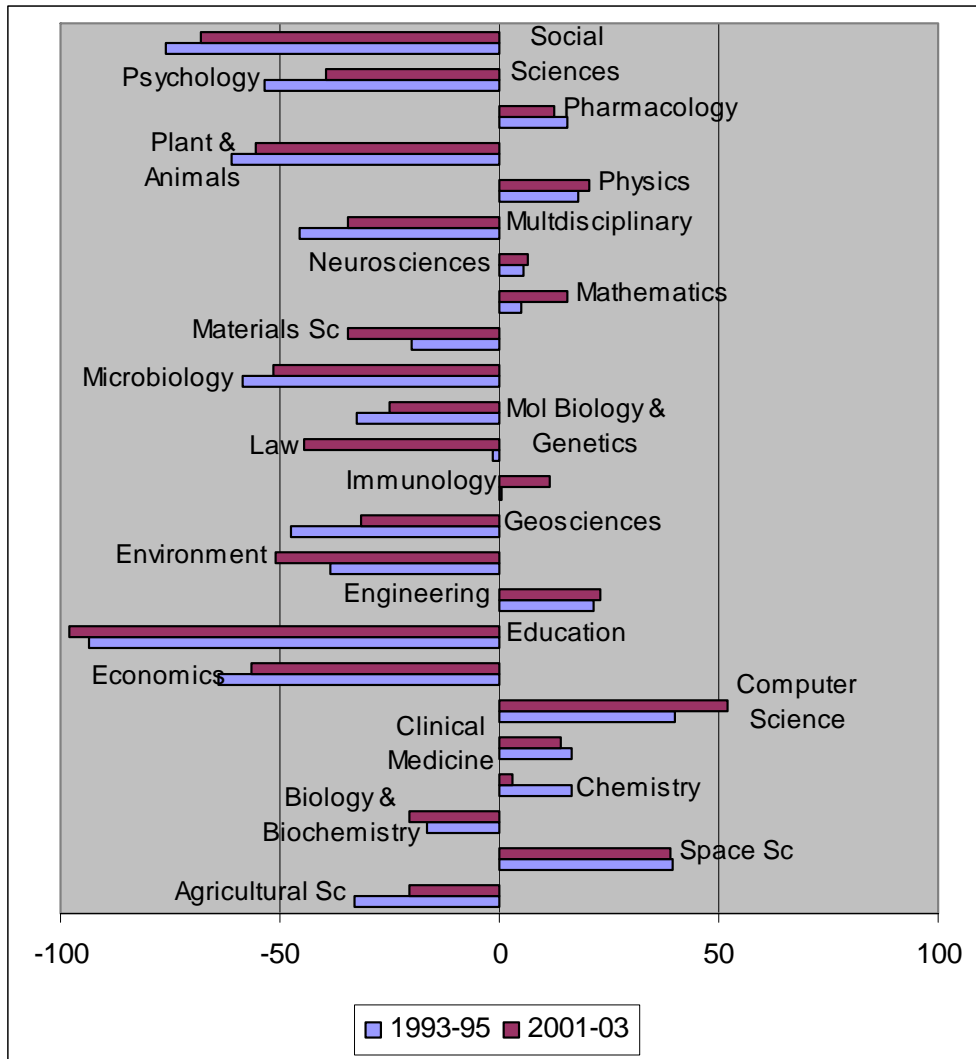
Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100. Source: Thomson ISI, NSIODE 2005, own calculations.

Figure 10. Shares of total publications by scientific field. 25 Scientific fields. Italy. 1993 and 2003.



Source: Thomson ISI, NSIODE 2005.

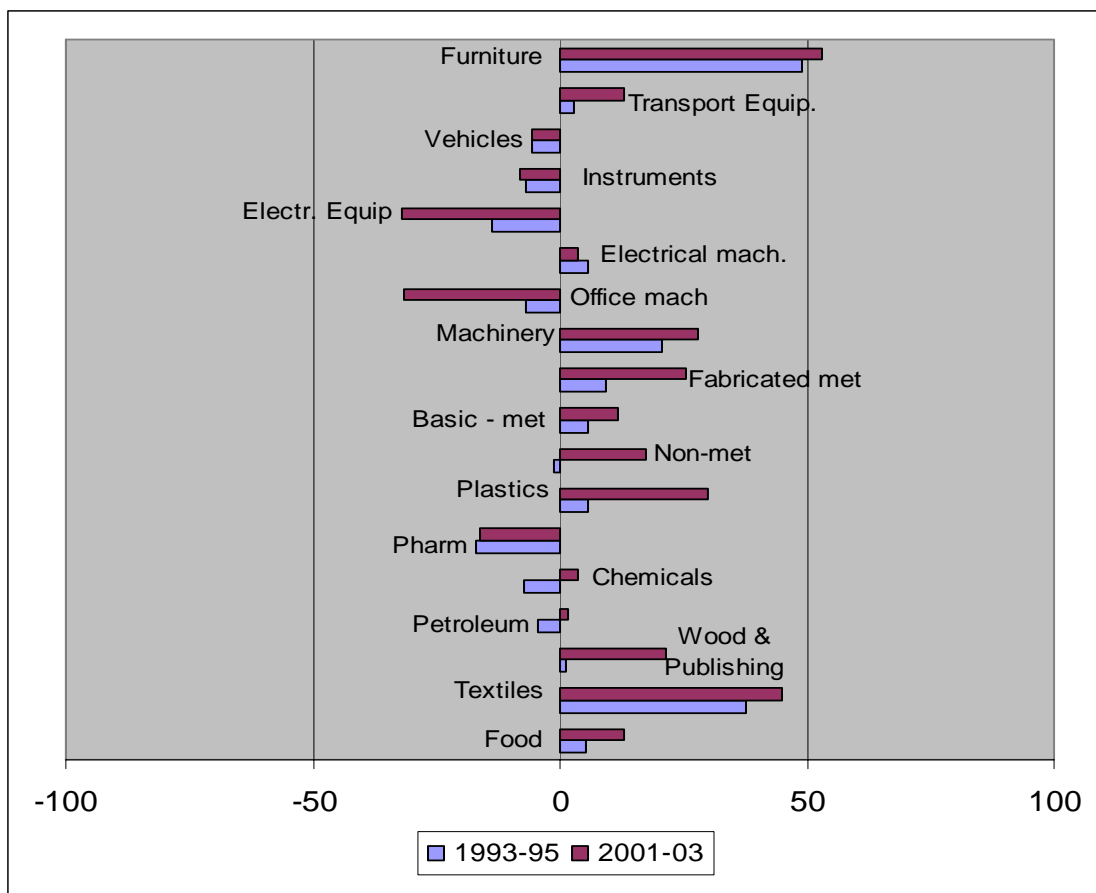
Figure 11. Number of citations by scientific field. 25 scientific fields. Specialisation profile. Italy. Averages 1993-1995 and 2001-2003. Five years citation window. (i.e. citations to papers published in the period 1989-1991 and in the period 1997-1999).



Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100.  
 Source: Thomson ISI, NSIODE 2005, own calculations.

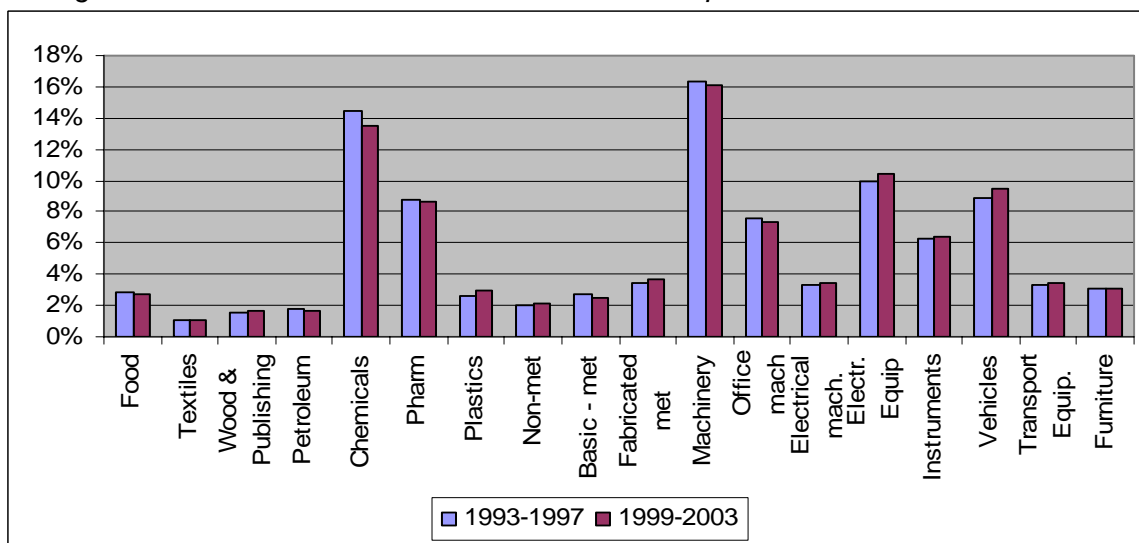
**PATENTS**

Figure 12. Number of patents by industrial sector. 18 sectors in manufacturing. Specialisation profile. Italy. Averages 1993-1995 and 2001-2003. Based on correspondence matrix ISI-SPRU-OST.



Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100. Source: European Patent Office 2005, own calculations.

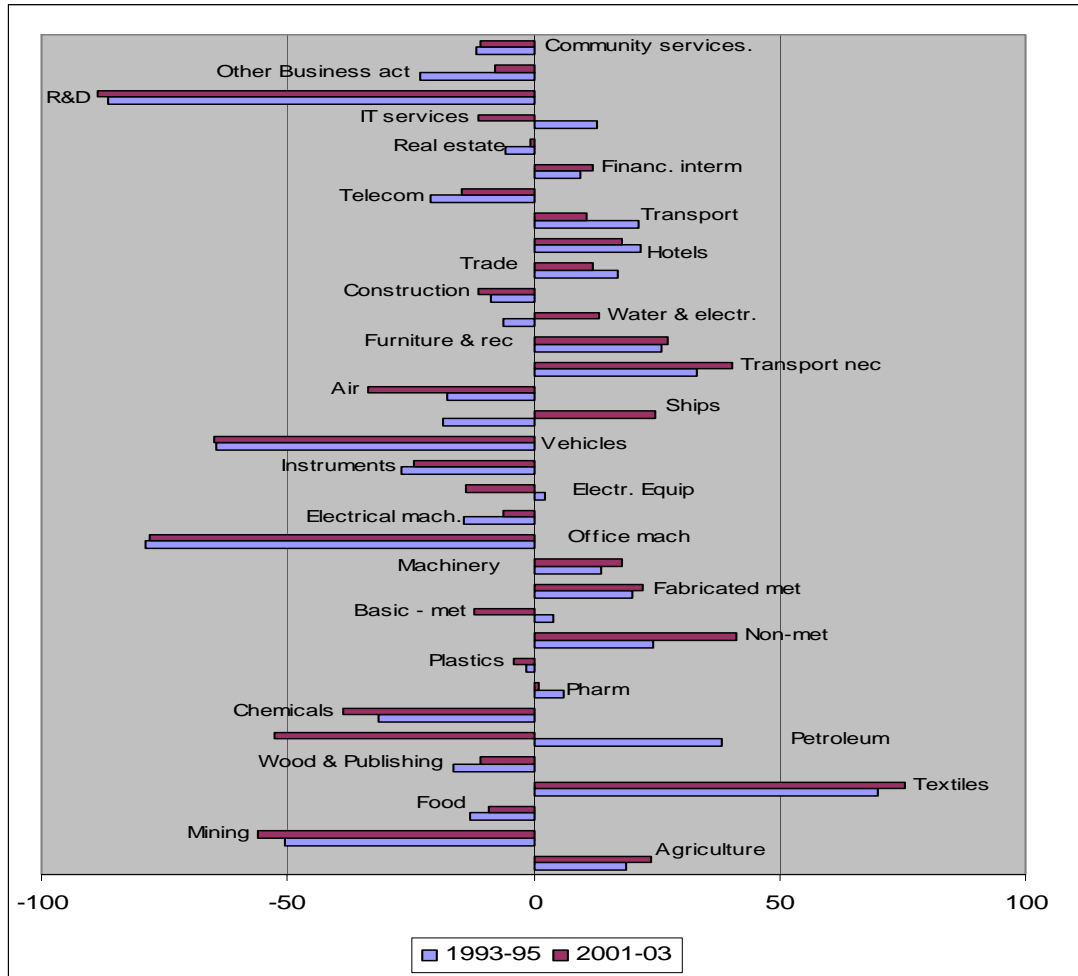
Figure 13. Shares of total patents by industrial sector. 18 sectors in manufacturing. Italy. Averages 1993-1997 and 1999-2003. Based on correspondence matrix ISI-SPRU-OST.



Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100. Source: European Patent Office 2005, own calculations.

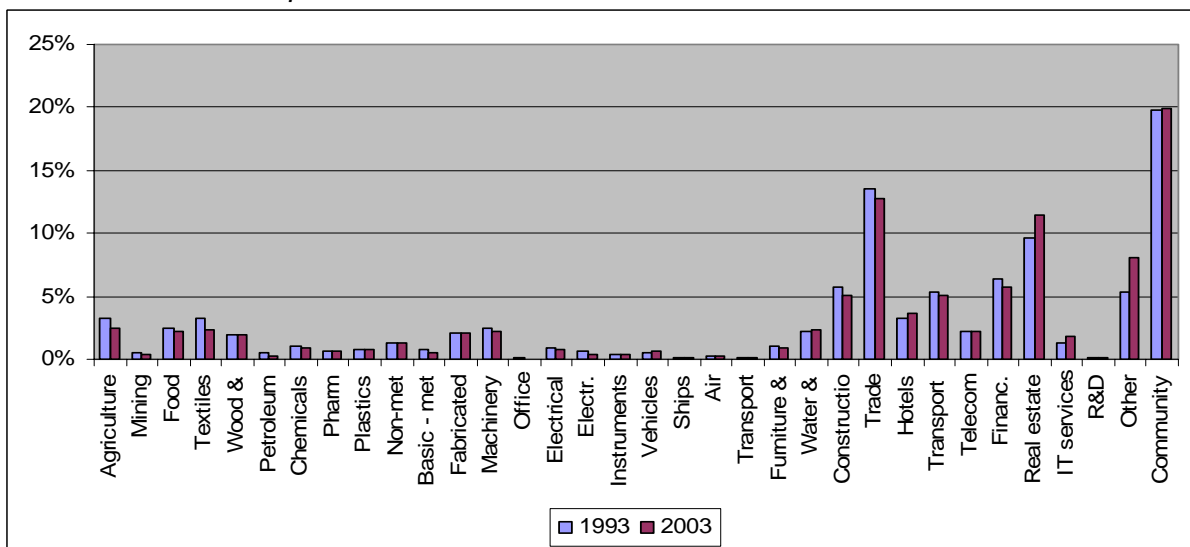
**ECONOMIC SPECIALISATION**

Figure 14. Value added by industrial sector. 34 sectors. Specialisation profile. Italy. Averages 1993-1995 and 2001-2003. Million Euros. Current prices.



Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100. Source: OECD, STAN 2005, own calculations.

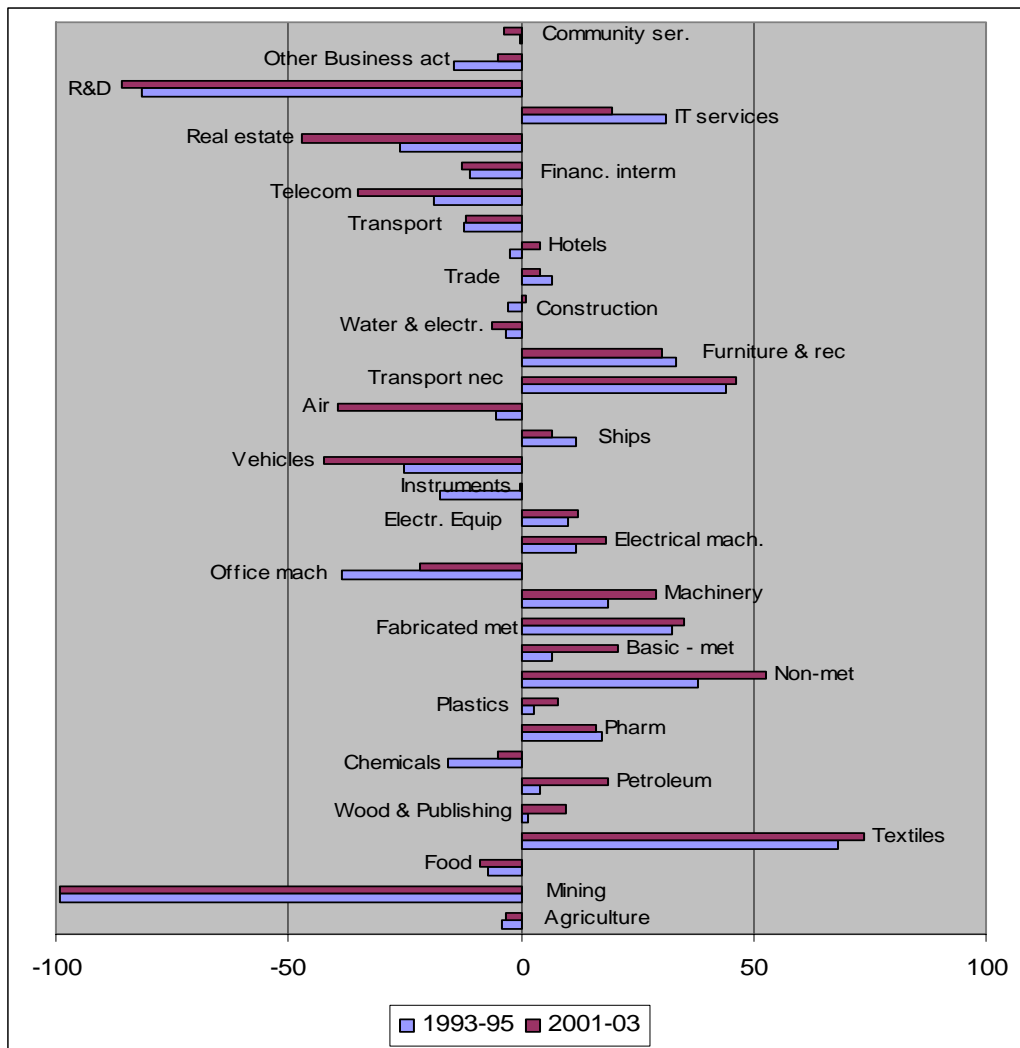
Figure 15. Shares of total value added by industrial sector. 34 sectors. Italy. 1993 and 2003. Million Euros. Current prices.



Source: OECD, STAN, 2005.

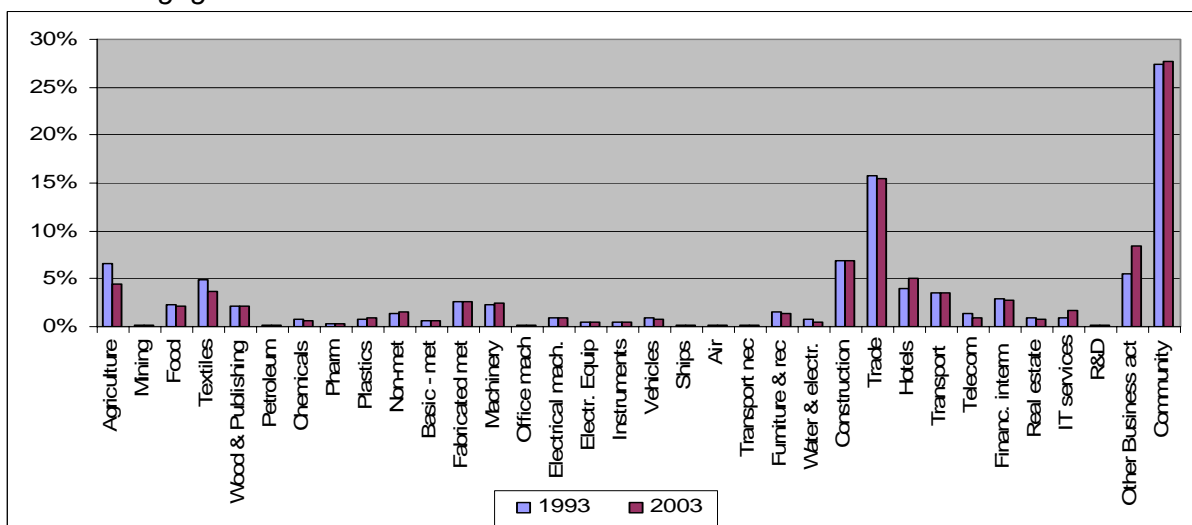


Figure 16. Employment by industrial sector. Specialisation profile. Italy. 34 sectors. Averages 1993-1995 and 2001-2003. Numbers engaged – hundreds.



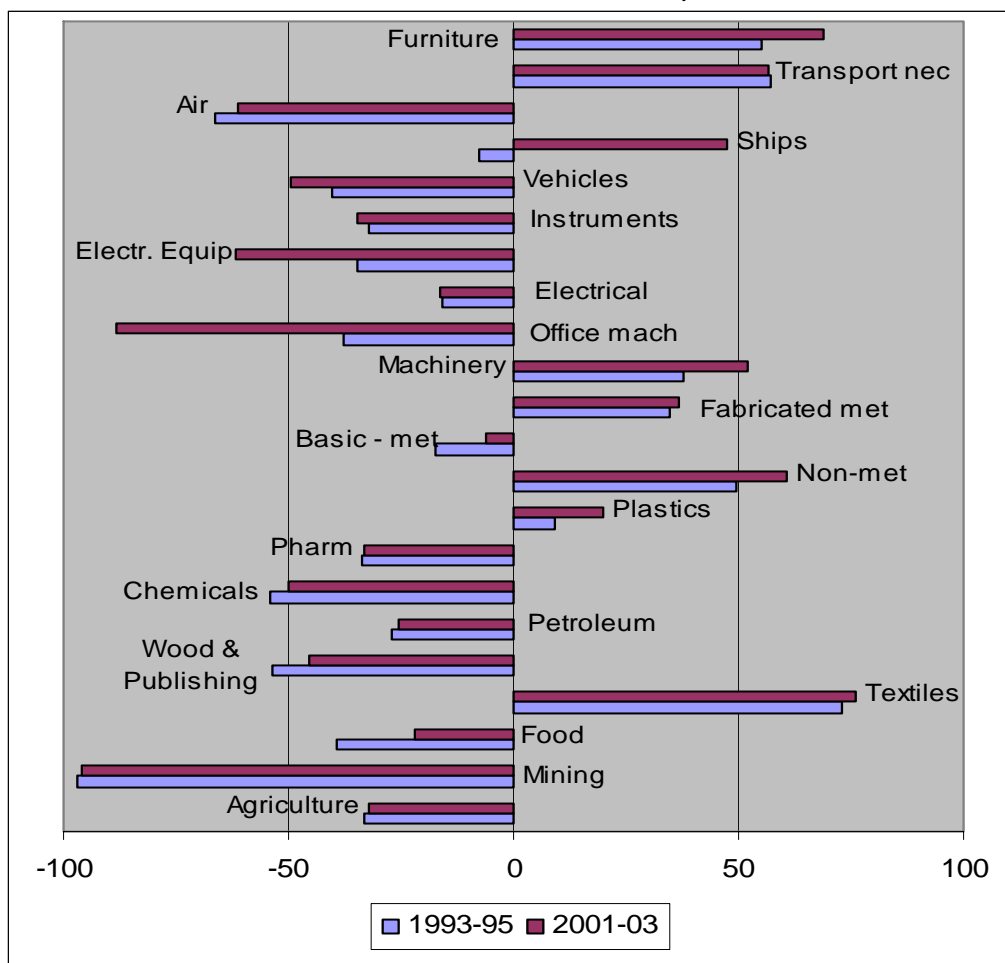
Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100. Source: OECD, STAN, 2005, own calculations.

Figure 17. Shares of total employment by industrial sector. 34 sectors. Italy. 1993 and 2003. Numbers engaged – hundreds.



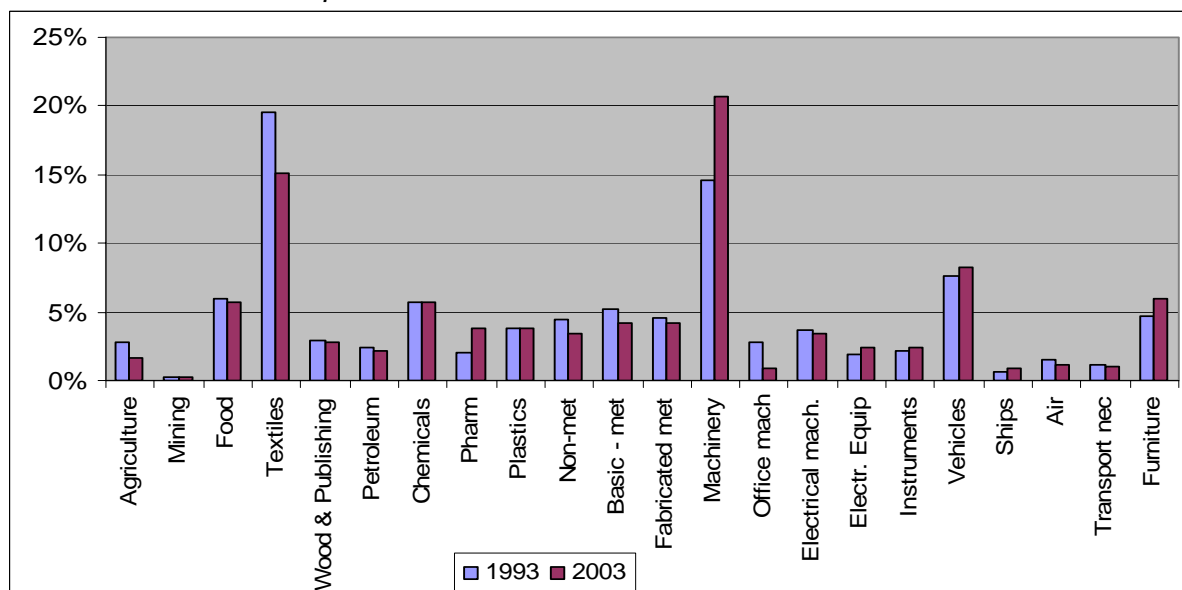
Source: OECD, STAN, 2005.

Figure 18. Exports by industrial sector. Specialisation profile. Italy. 34 sectors. Averages 1993-1995 and 2001-2003. Thousand USD. Current prices.



Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100. Source: UNIDO, INDSTAT4 2005, ISIC Rev3 and COMTRADE 2005, own calculations.

Figure 19. Shares of total exports by industrial sector. 34 sectors. Italy. 1993 and 2003. Thousand USD. Current prices.



Source: UNIDO, INDSTAT4 2005, ISIC Rev3 and COMTRADE 2005, own calculations.

## CORRELATION ANALYSIS

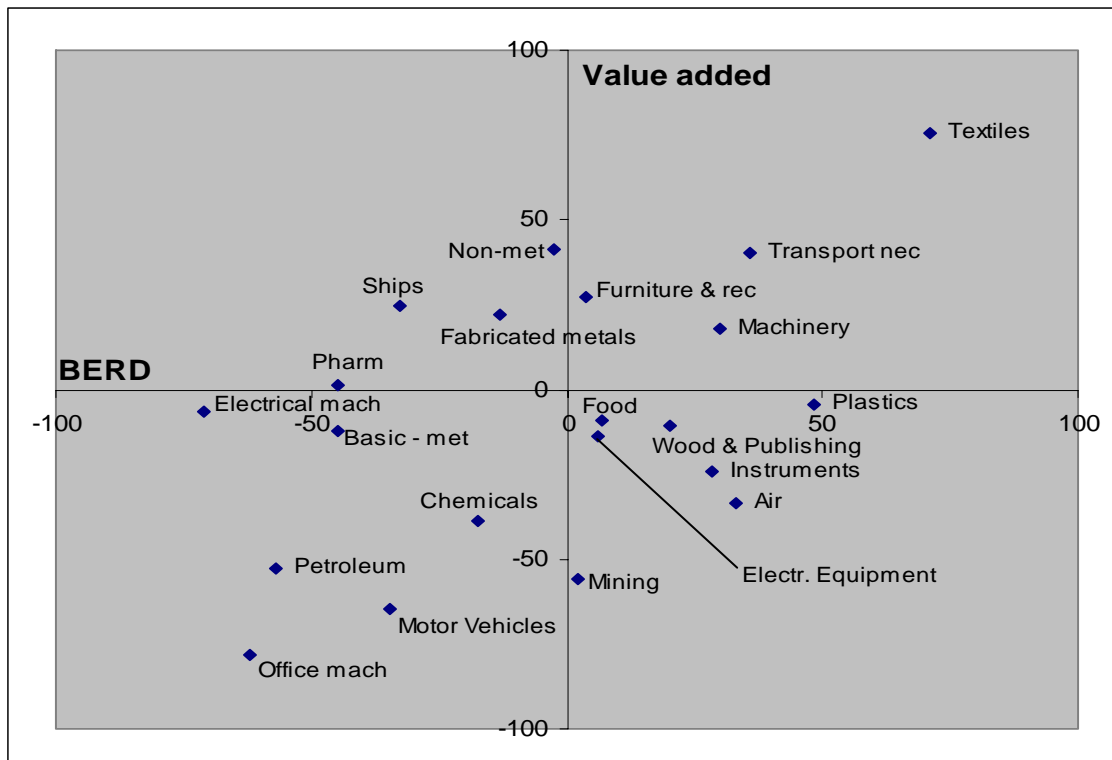
Table 2. Correlation analysis. Specialisation indexes BERD, Value added, Employment, Exports and patents. Italy. Averages 1993-1995 and 2001-2003.

		IT_BERD 9395	IT_BERD 0103	IT_PAT 9395	IT_PAT 0103	IT_VA 9395	IT_VA 0103	IT_EMP 9395	IT_EMP 0103	IT_EXP 9395	IT_EXP 0103
IT_BERD9395	Pearson Correlation Sig. (2-tailed)	1 .									
IT_BERD0103	Pearson Correlation Sig. (2-tailed)	-.163 .382	1 .								
IT_PAT9395	Pearson Correlation Sig. (2-tailed)	-.286 .266	.452 .068	1 .							
IT_PAT0103	Pearson Correlation Sig. (2-tailed)	-.491* .045	.552(*) .022	.861(**) .000	1 .						
IT_VA9395	Pearson Correlation Sig. (2-tailed)	-.331 .069	.158 .388	.539(*) .026	.615(**) .009	1 .					
IT_VA0103	Pearson Correlation Sig. (2-tailed)	-.267 .146	.234 .198	.641(**) .006	.707(**) .001	.831(**) .000	1 .				
IT_EMP9395	Pearson Correlation Sig. (2-tailed)	-.132 .479	.021 .910	.623(**) .008	.653(**) .004	.813(**) .000	.793(**) .000	1 .			
IT_EMP0103	Pearson Correlation Sig. (2-tailed)	-.180 .332	.006 .972	.554(*) .021	.594(*) .012	.794(**) .000	.760(**) .000	.952(**) .000	1 .		
IT_EXP9395	Pearson Correlation Sig. (2-tailed)	-.070 .771	.341 .131	.776(**) .000	.732(**) .001	.717(**) .000	.799(**) .000	.842(**) .000	.849(**) .000	1 .	
IT_EXP0103	Pearson Correlation Sig. (2-tailed)	-.092 .698	.357 .112	.788(**) .000	.859(**) .000	.730(**) .000	.858(**) .000	.819(**) .000	.796(**) .000	.938(**) .000	1 .

\* Correlation is significant at the 0.05 level (2-tailed).

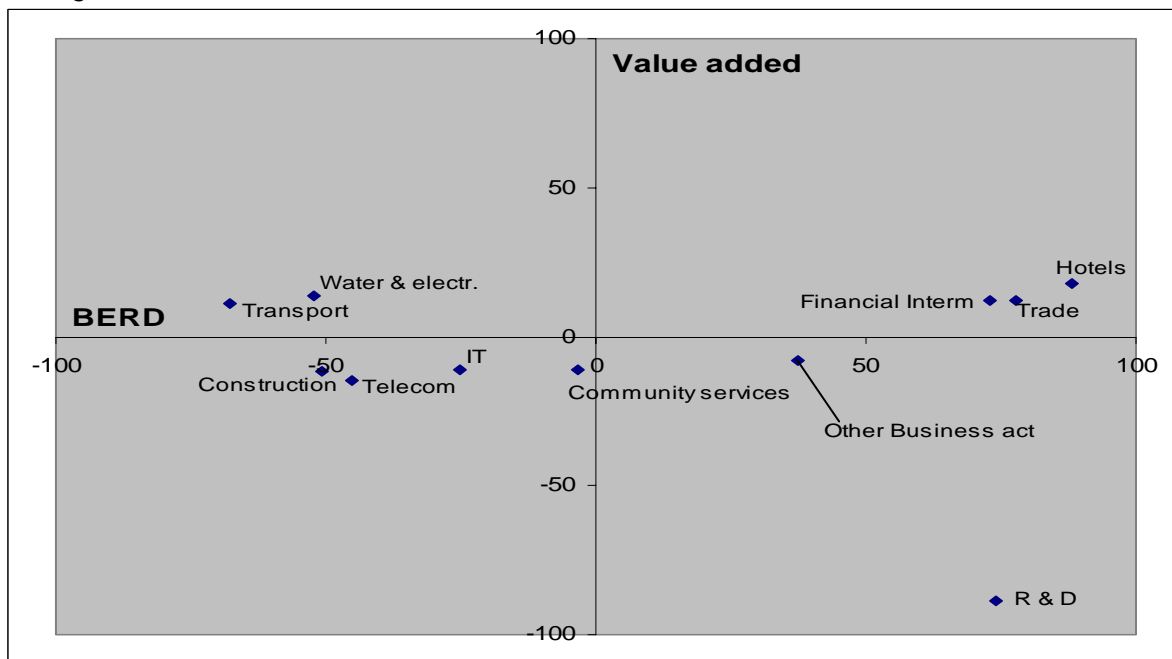
\*\* Correlation is significant at the 0.01 level (2-tailed).

Figure 20. BERD versus Value added specialisation in the primary and secondary industrial sectors. Italy. Based on average values 2001- 2003.



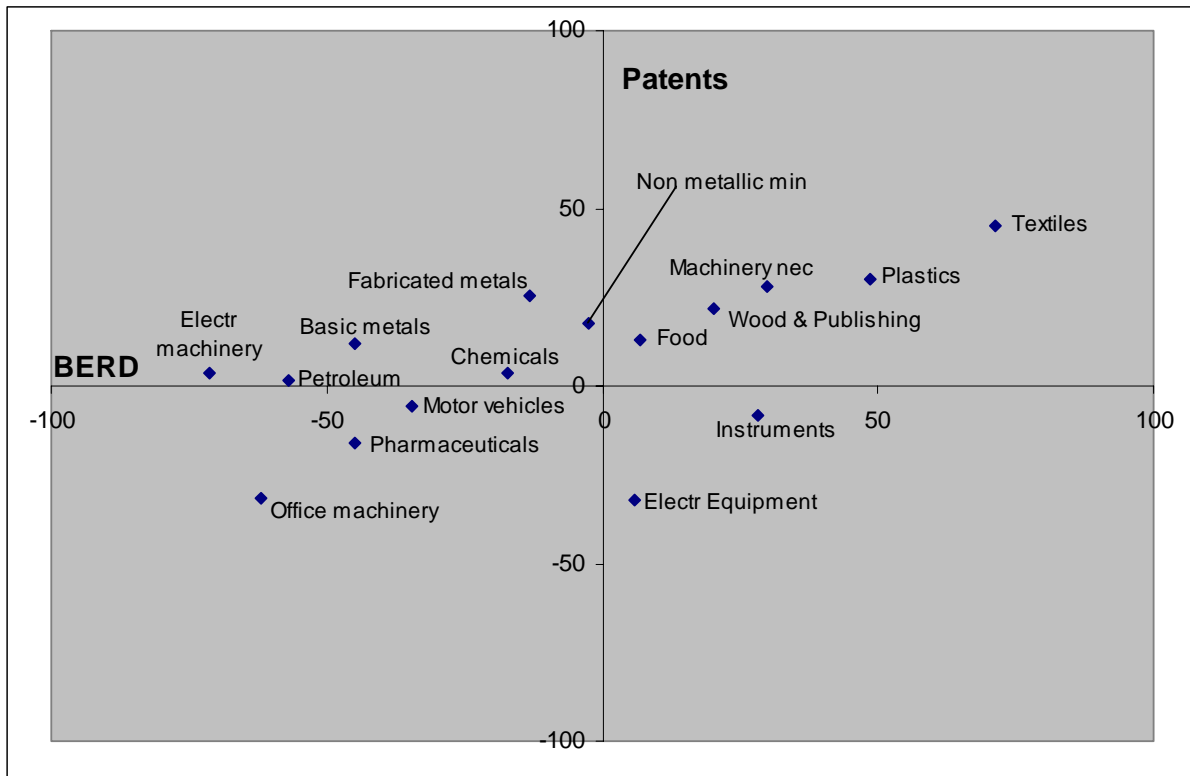
Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100.  
Source: Own calculations

Figure 21 BERD versus Value added in services. Specialisation indexes. Italy. Based on average values 2001- 2003.



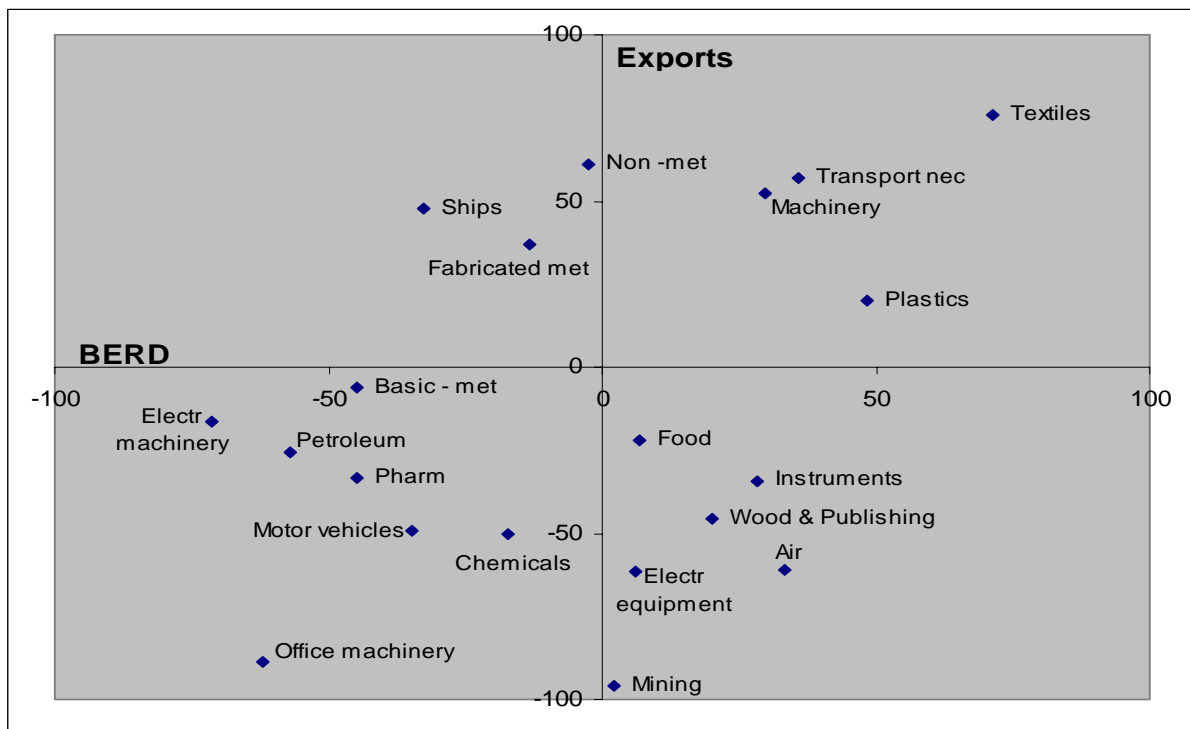
Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100.  
Source: Own calculations

Figure 22. BERD versus patents. Specialisation indexes. Italy. Based on average values 2001- 2003.



Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100.  
Source: Own calculations

Figure 23. BERD versus exports. Specialisation indexes. Italy. Based on average values 2001- 2003.



Notes: Specialisation index with EU15 as reference. Max specialisation: + 100. Min. specialisation: -100.  
Source: Own calculations

Table 3: Specialisation Profile

Areas of specialisation	Fast growing sectors >4.9%			Medium-Low growth sectors =<4.9%			Declining sectors <0		
	Increase Specialisation	Stable Specialisation	Losing Specialisation	Increase Specialisation	Stable Specialisation	Losing Specialisation	Increase Specialisation	Stable Specialisation	Losing Specialisation
Specialisation BERD	50-52;55 65-67; 74		23;2423 352+359; 73	20-22; 25; 26; 29; 33 36-37	353	30; 32; 34;351; 40- 41	17-19		
Specialisation Patents				15-16; 20-22; 24ex2423; 25;26;27;28;29	31		17-19		
Specialisation Value Added	352+359 70-71	55; 65-67	23;2423 50-52; 60-63	01-05;26; 28 40-41	29; 351	32	17-19		
Specialisation Employment	23; 352+359 45;55	50-52	72;	25;26;20- 22;25;26;27;28; 29;31;32;33		351	17-19		
Specialisation Exports			352+359	25;29;36;351	26;28			17-19	

Red numbers: Decrease specialisation from specialised to non specialised

Blue numbers: Increase specialisation from non specialised to specialised

**EXPLANATORY NOTES****ISIC v3 codes and sector description**

Agriculture	01-05
Mining	10-14
Food	15-16
Textiles	17-19
Wood & Publishing	20-22
Petroleum	23
Chemicals excluding pharmaceuticals	24ex2423
Pharmaceuticals	2423
Plastics	25
Non-metal minerals	26
Basic metals	27
Fabricated metals	28
Machinery nec	29
Office machinery	30
Electrical mach.	31
Electronic equip.	32
Instruments	33
Motor vehicles	34
Ships	351
Air	353
Transport nec	352+359
Furniture & recycling	36-37
Water & electr.	40-41
Construction	45
Trade	50-52
Hotels	55
Transport	60-63
Telecoms	64
Financial intermediation	65-67
IT services	72
R & D	73
Other Business activities	74
Community services	75-99

**How to read specialisation profile figures**

Plotting specialisation indexes against each other is a method for visualising differences in specialisation patterns. The most interesting analytical dimension in this report is comparing business enterprise intramural R&D expenditure specialisation patterns with specialisation patterns in value added, employment, exports and technological specialisation (patents). The result of the plots is four distinct specialisation quadrants showing:

1. Sectors with **neither specialisation in BERD nor in the other analytical dimension** (lower left quadrant)
2. Sectors with **a specialisation in BERD and in the other analytical dimension** (upper right quadrant)
3. Sectors with a **specialisation in BERD but none in the other analytical dimension** (lower right quadrant)
4. Sectors that display a **specialisation in the other analytical dimension but not in BERD** (upper left quadrant)

If there is a good match between BERD and, say, value added specialisation patterns we expect to find all sectors either in the lower left or in the upper right quadrant. Sectors in the upper left or in the lower right of the graphs indicate anomalies, that is, specialisation in one dimension and non-specialisation in the other. If there are many sectors in these quadrants the graph indicates lack of correlation between BERD and, say, economic specialisation.

*BERD and Value Added specialisation – an example*

