

Class
Italian industry
General features

IPS
Sandrine Labory

What are the characteristics of Italian productive sectors?

Italian industry is competitive on the global market?

Are there any leading sectors in the Italian economy?

⇔ Problematics of this class

Productive sectors

Some definitions:

- Productive sectors =
primary sector (agriculture)
secondary sector (industry)
tertiary sector (services)
- ⇒ We mainly consider the secondary (manufacturing)
and tertiary sectors (today services are increasingly
linked to manufacturing)
- Statistical definition of industry = mining (2%) +
manufacturing (90%) + production and distribution
of gas, energy and water (9,5%)

Evolution in the last 20 years in all countries:

“tertiarisation” of the economy:

% of manufacturing sector in the value added of the economy ↓ in all developed countries:

Italy: 1980: 29,3%

1990: 23,5%

2000: 20,8%

2010: 16,6%

However, the % of employees in the manufacturing sector in Italy is > share in other countries (UK, G, F)

⇒ Delay in tertiarisation?

RECALL: COMPETITIVE CONTEXT

DEMAND: NEED FOR NEW PRODUCTS AND
TECHNOLOGIES

1 NO
POVERTY



2 NO
HUNGER



3 GOOD
HEALTH



4 QUALITY
EDUCATION



5 GENDER
EQUALITY



6 CLEAN WATER
AND SANITATION



7 RENEWABLE
ENERGY



8 GOOD JOBS AND
ECONOMIC GROWTH



9 INNOVATION AND
INFRASTRUCTURE



10 REDUCED
INEQUALITIES



11 SUSTAINABLE CITIES
AND COMMUNITIES



12 RESPONSIBLE
CONSUMPTION



13 CLIMATE
ACTION



14 LIFE BELOW
WATER



15 LIFE
ON LAND



16 PEACE AND
JUSTICE



17 PARTNERSHIPS
FOR THE GOALS

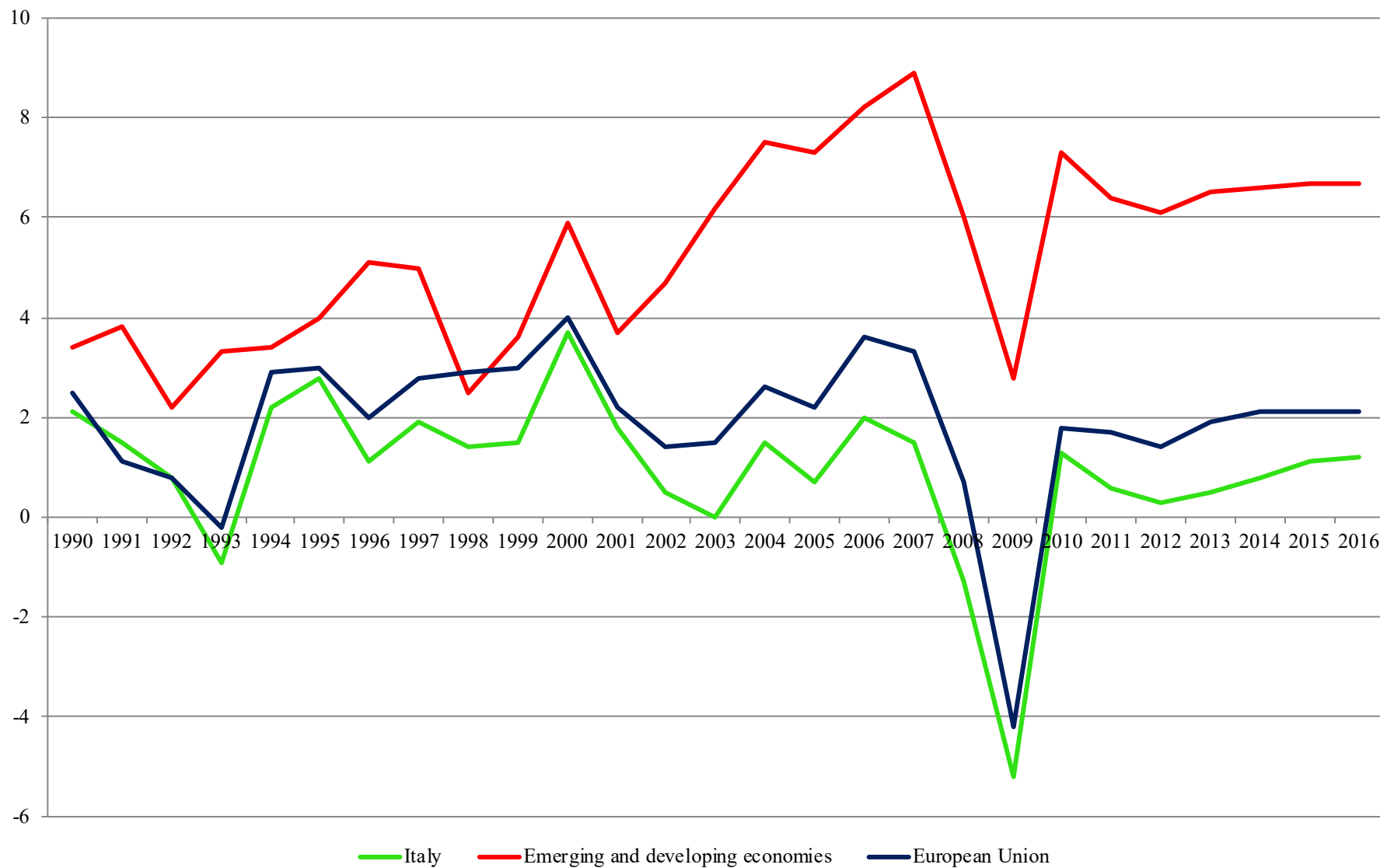


THE GLOBAL GOALS
For Sustainable Development

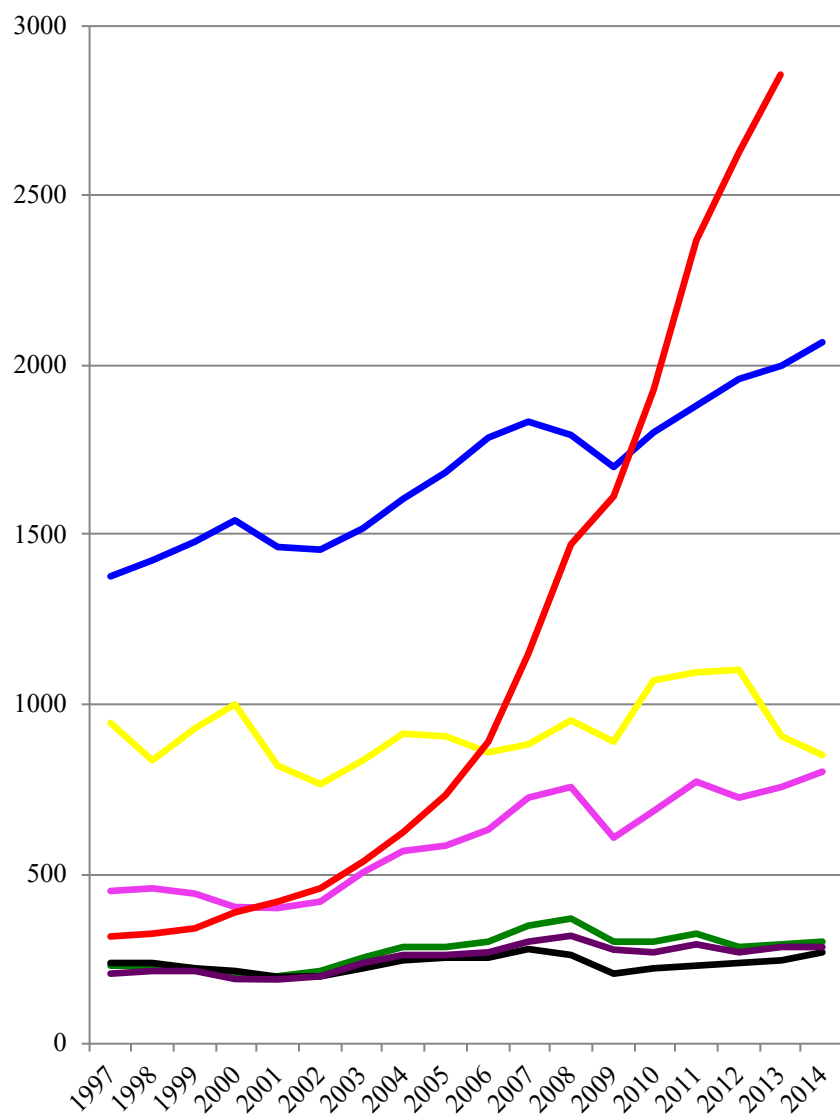
SUPPLY: PRODUCERS' STRATEGIES TO MEET THE NEW DEMAND

- RISE OF ASIA
- FOURTH INDUSTRIAL REVOLUTION
DRIVING PRODUCTIVITY GROWTH IN
MANUFACTURING (output ↑, employment ↓)

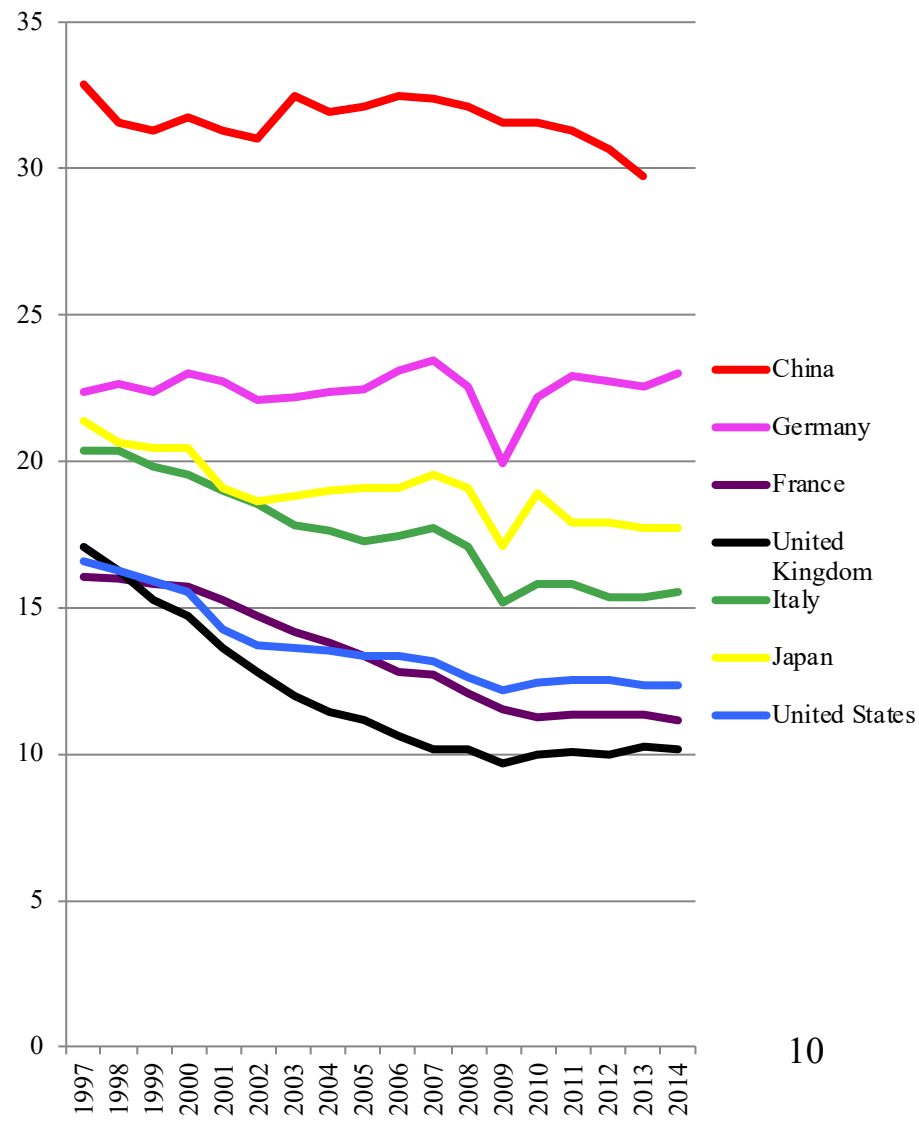
Real GDP growth, 1990-2016



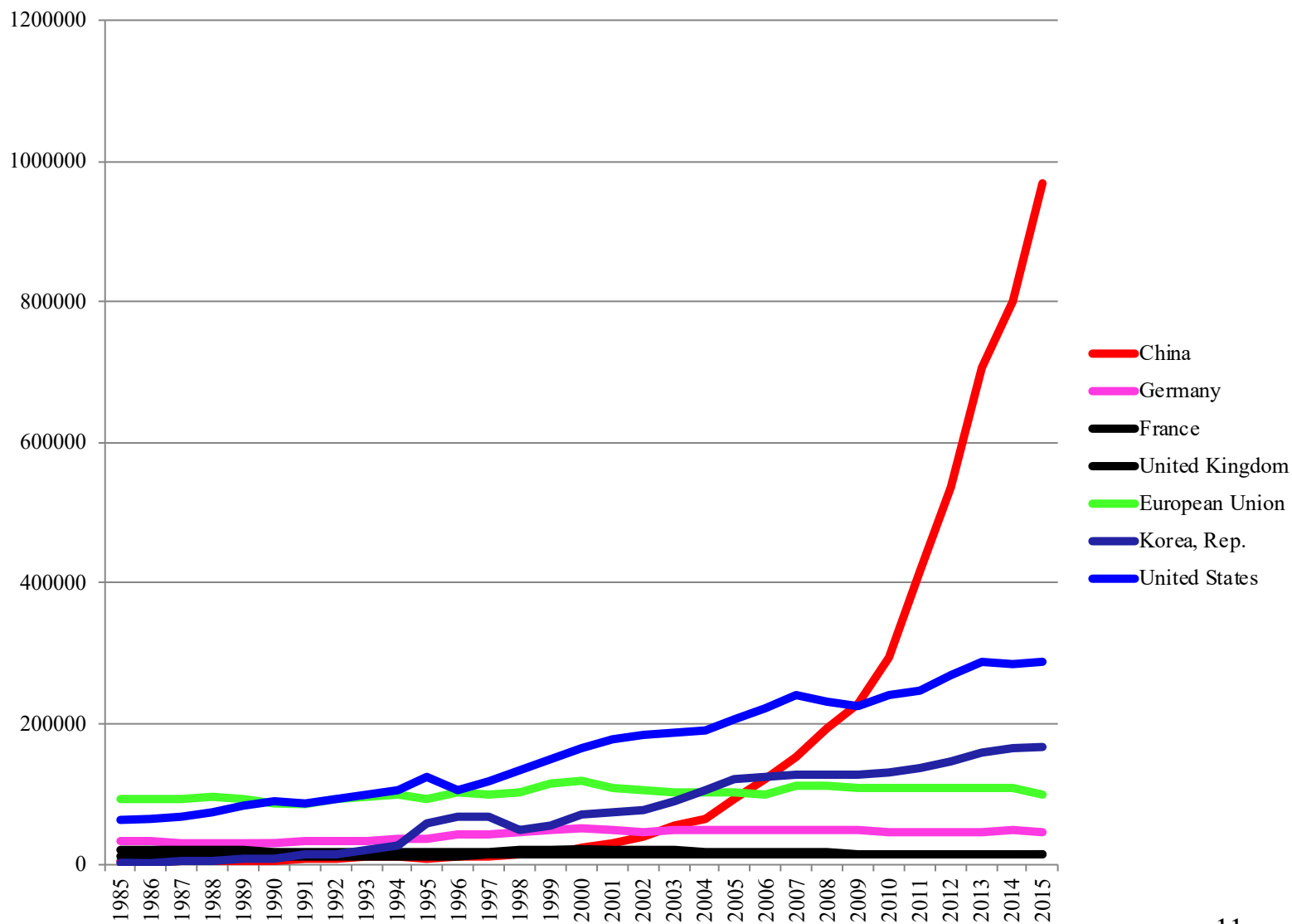
VA, current prices, \$ bn



VA as % of GDP



Patents, 2004 -2014



**Italy is among the first
manufacturing countries in the
world, and 9th exporter**

**Comparative advantage in the
mechanical engineering sector:**

= one third of employment in manufacturing

**= 3th exporting country of machines in the
world**

Mechanical engineering:

**Industry 4.0 is important in Italy given
the specialisation in mechanical
engineering**

**2018: world country with highest growth
rate of robotics was = ITALY**

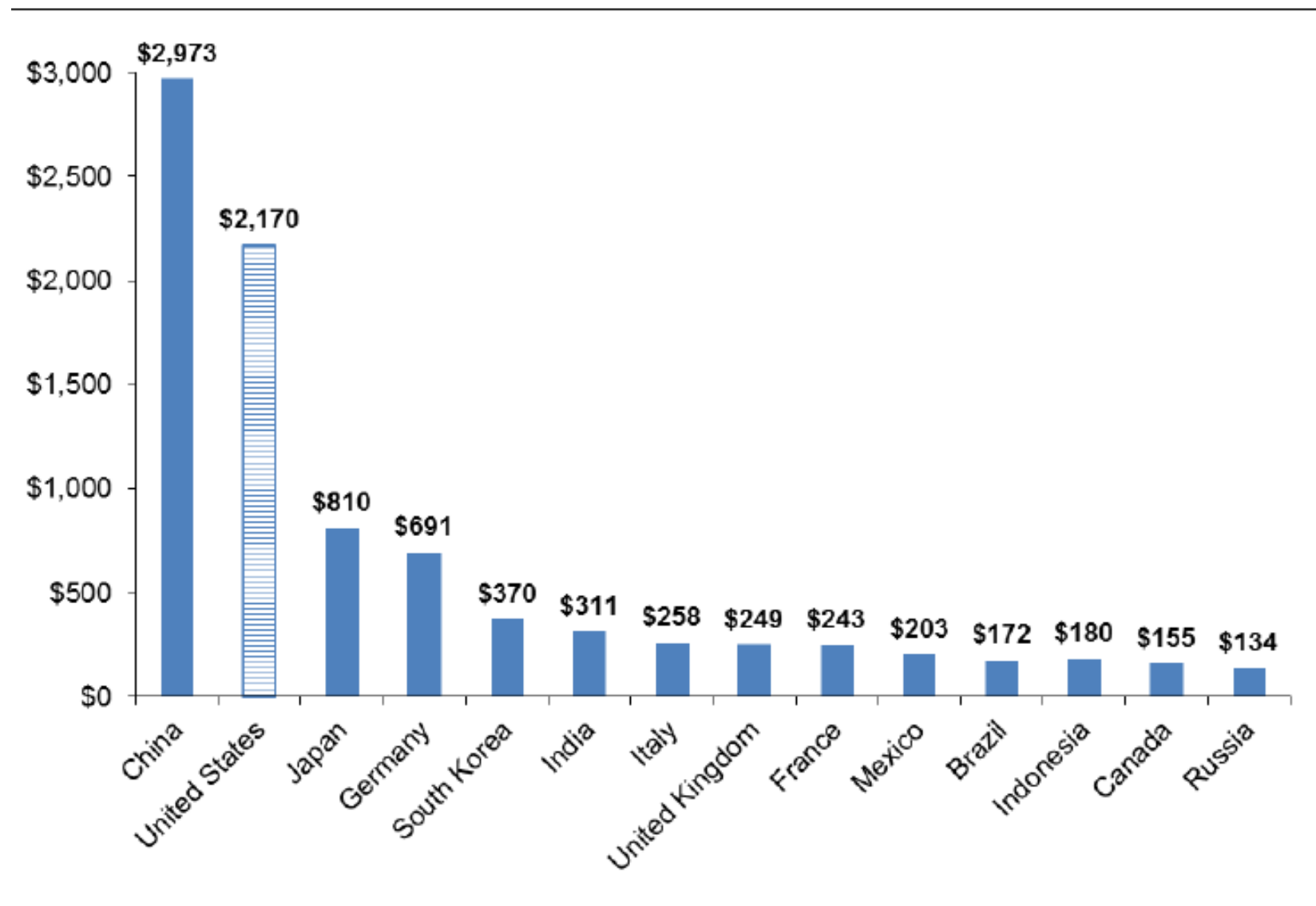
Table 1. Top 15 manufacturers by share of global nominal manufacturing gross value added

Rank	1980	1990	2000	2010
1	United States	United States	United States	United States
2	Germany	Japan	Japan	China
3	Japan	Germany	Germany	Japan
4	UK	Italy	China	Germany
5	France	UK	UK	Italy
6	Italy	France	Italy	Brazil
7	China	China	France	South Korea
8	Brazil	Brazil	South Korea	France
9	Spain	Spain	Canada	UK
10	Canada	Canada	Mexico	India
11	Mexico	South Korea	Spain	Russia
12	Australia	Mexico	Brazil	Mexico
13	Netherlands	Turkey	Taiwan	Indonesia
14	Argentina	India	India	Spain
15	India	Taiwan	Turkey	Canada

Source: McKinsey (2012, p. 2).

Figure 1. Leading Countries, Value Added in Manufacturing

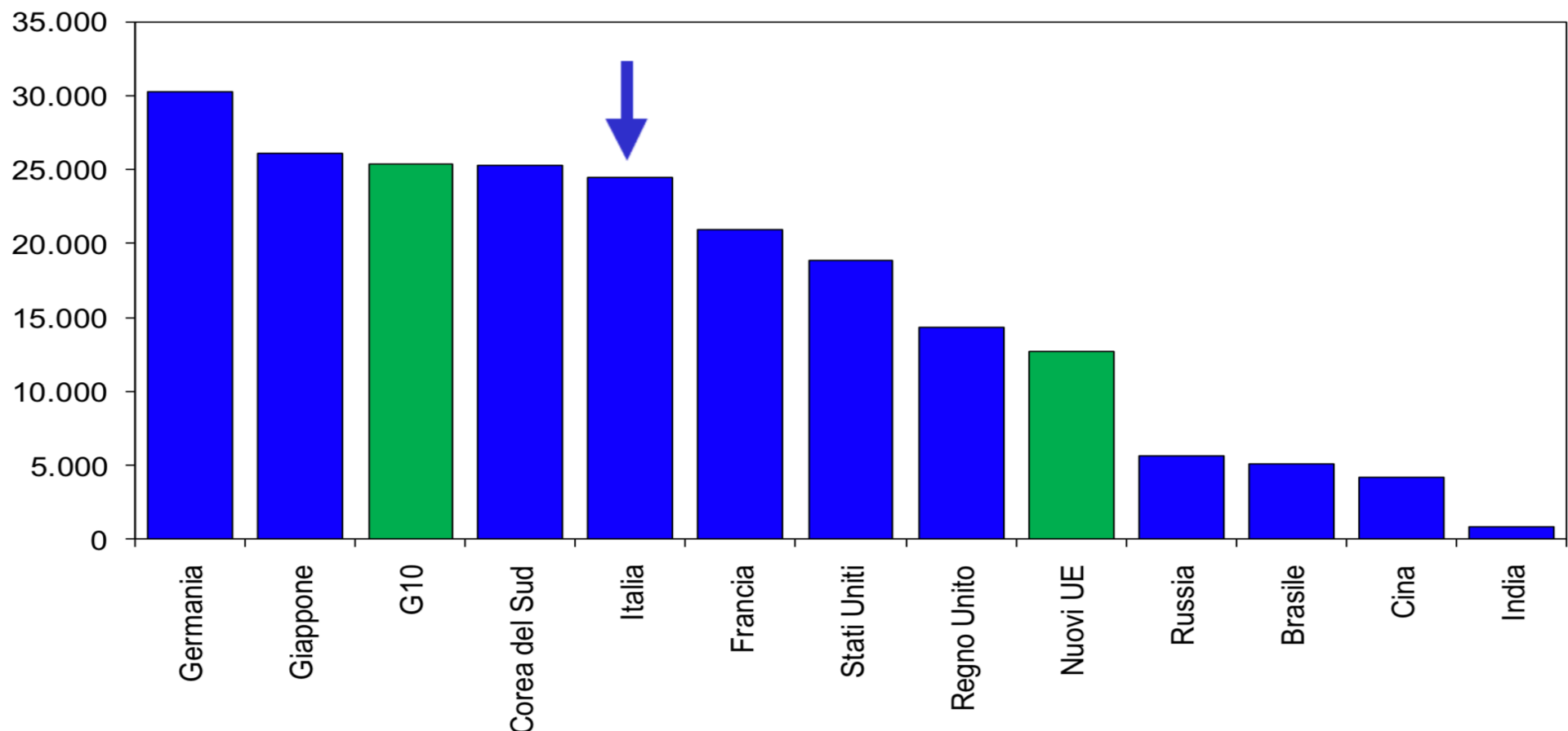
Billion dollars, 2015



Source: United Nations National Accounts Main Aggregates Database, value added by economic activity, at current prices—U.S. dollars.

L'industrializzazione è più alta negli avanzati

(Produzione manifatturiera pro-capite, 2012, dollari correnti)



G10 = Belgio, Canada, Francia, Germania, Giappone, Italia, Paesi Bassi, Regno Unito, Stati Uniti, Svezia, Svizzera.

Nuovi UE = Rep. Ceca, Rep. Slovacca, Bulgaria, Romaniaa, Ungheria, Polonia.

Fonte: elaborazioni CSC su dati Global Insight.

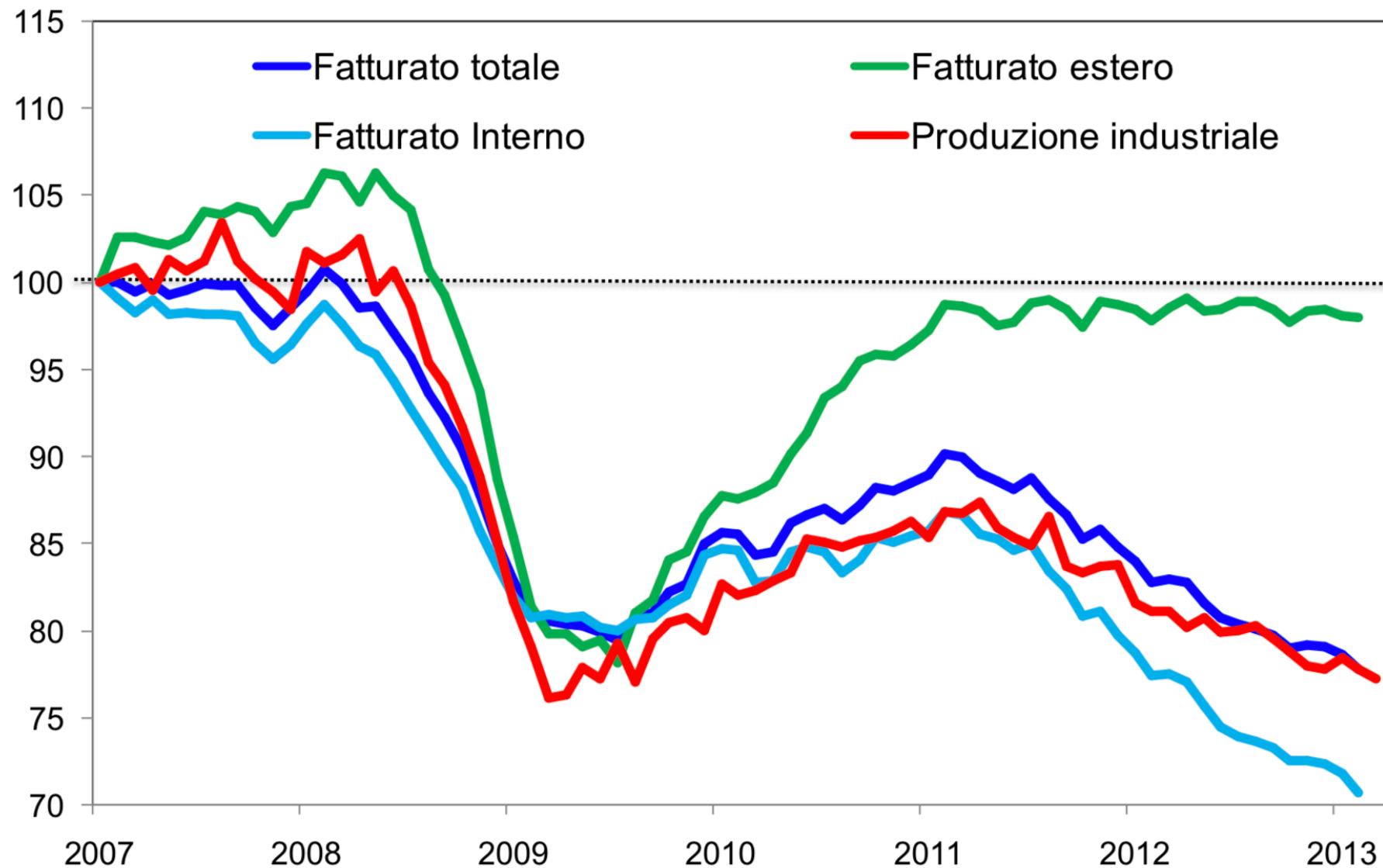
**The strength of Italian industry is even clearer
if we take PER CAPITA values**

Did the financial crisis have big effect on Italian industry?

Next slide: firms' revenue from domestic versus foreign markets

Fatturato interno in forte calo

(Italia, indici mensili in volume e destagionalizzati, medie mobili centrate a 3 termini per il fatturato, gennaio 2007=100)



Fonte: elaborazioni CSC su dati ISTAT.

Crisis:

- Strong fall in domestic demand
- Italian firms have therefore increased effort to export

➔ Internationalisation is fundamental

(The 2020 crisis will be stronger)

Centro studi Confindustria (Research centre of the Italian federation of industries):

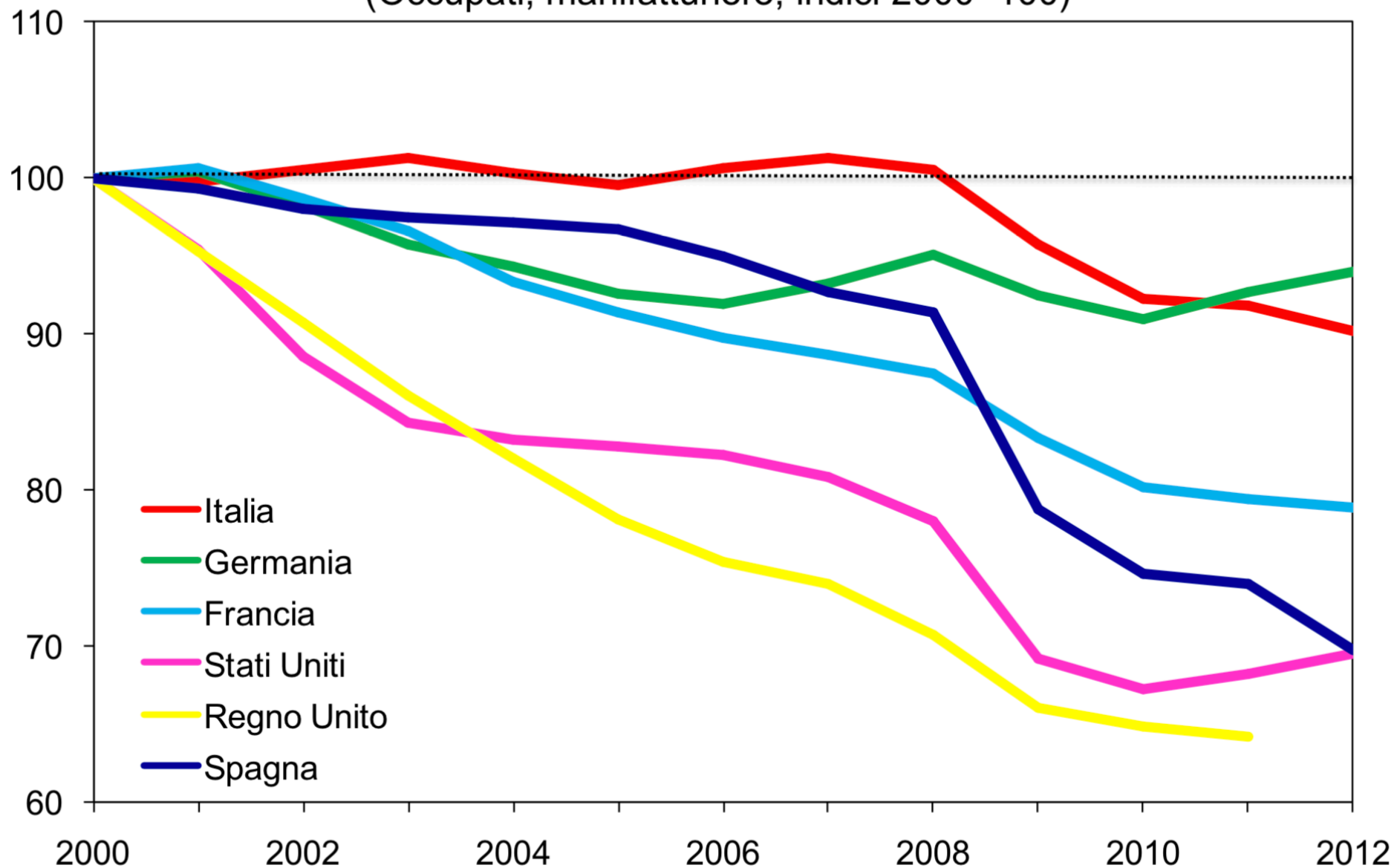
Number of manufacturing firms in Italy fell by 8.3 % over the period 2007 to 2012 (mostly SMEs)

Firms which have suffered less from the crisis have been those implementing internationalisation strategies

+ same LT tendency for reduction of employment:
effect of Industry 4.0?

In Italia l'occupazione industriale cala meno

(Occupati, manifatturiero, indici 2000=100)



Fonte: elaborazioni CSC su dati Eurostat, BLS e Global Insight.

Internationalisation:

- Italian exports have high value added**
- Main partners: Germany, France and USA**
- 48% of Italian exports are in mechanical engineering sector**

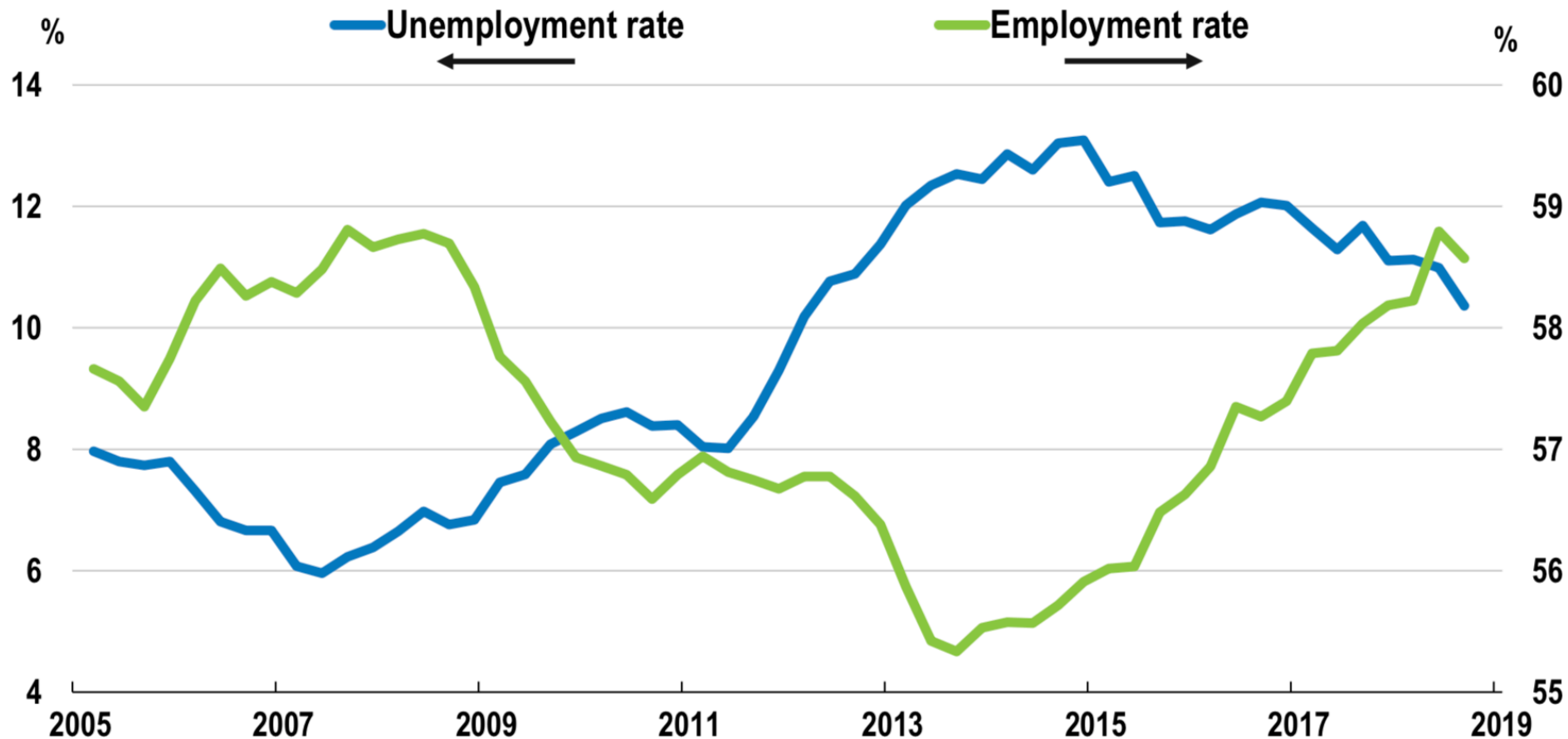
Rinascimento industriale con export e investimenti

—di **Luca Orlando** | 5 giugno 2018

**From 2016: large investments in Industry 4.0
Calenda Plan**

More jobs have been created and unemployment has fallen

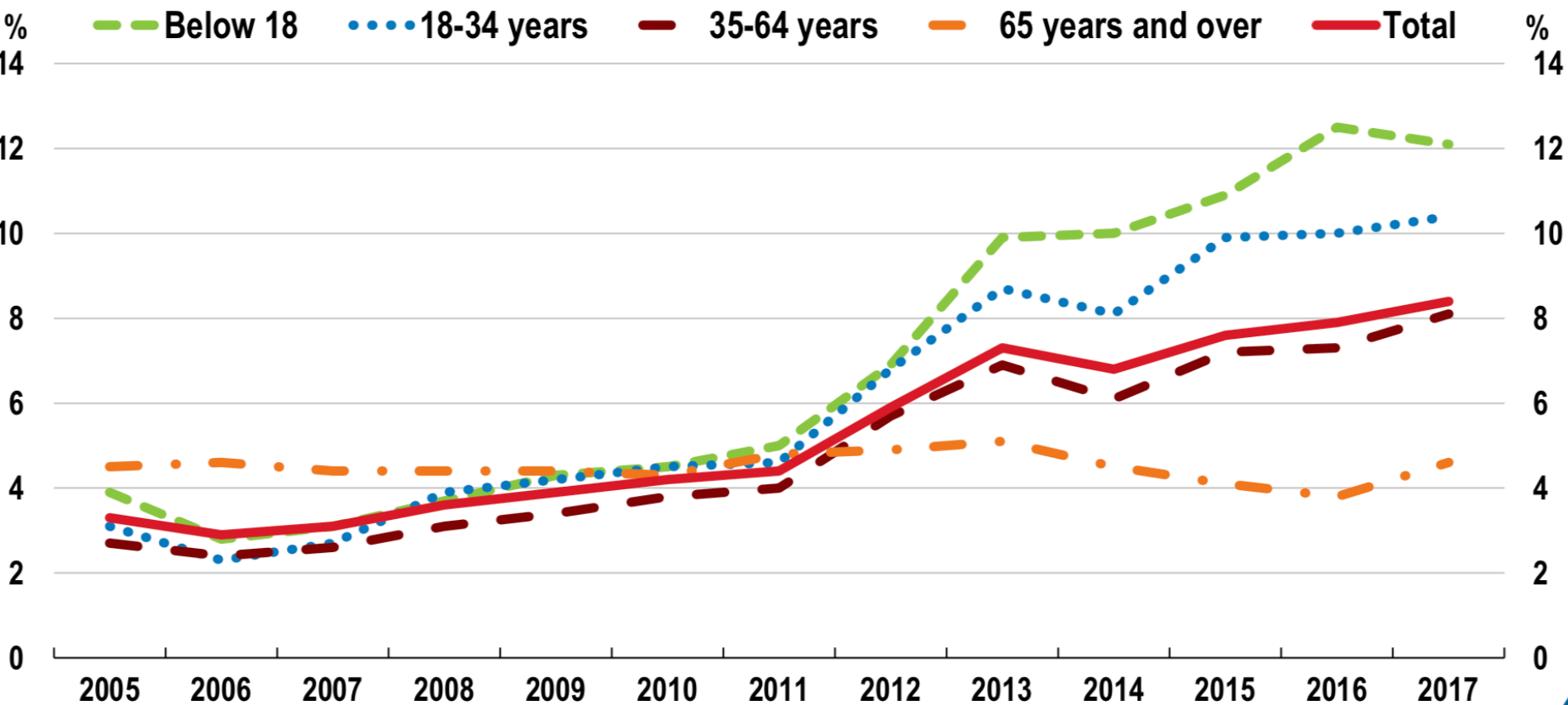
Employment and unemployment rates





Poverty rose during the crisis, especially for the young

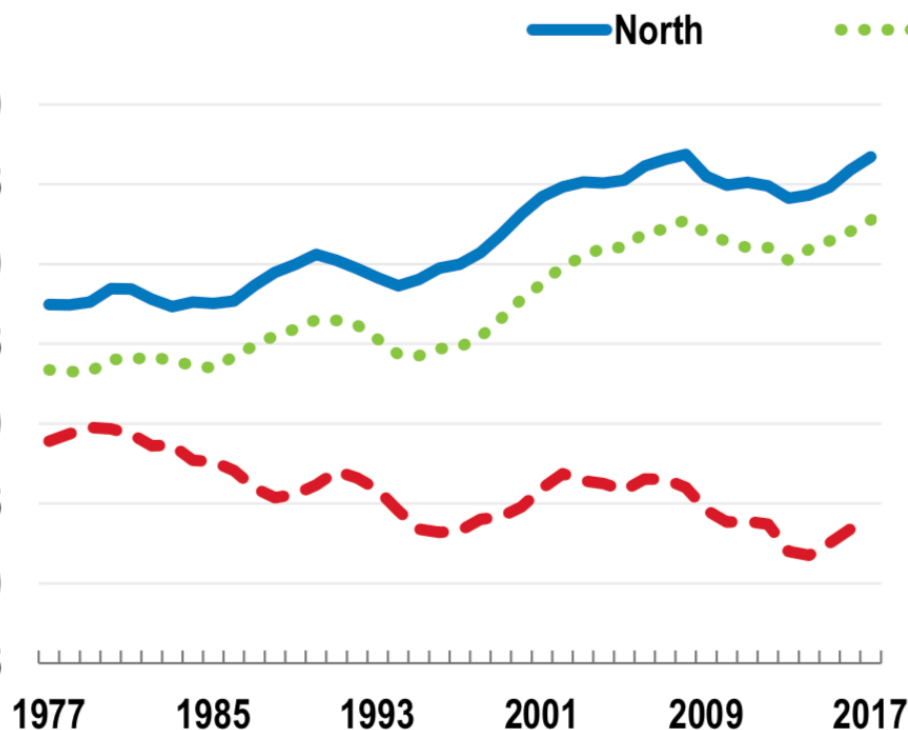
% of age groups living in households in absolute poverty



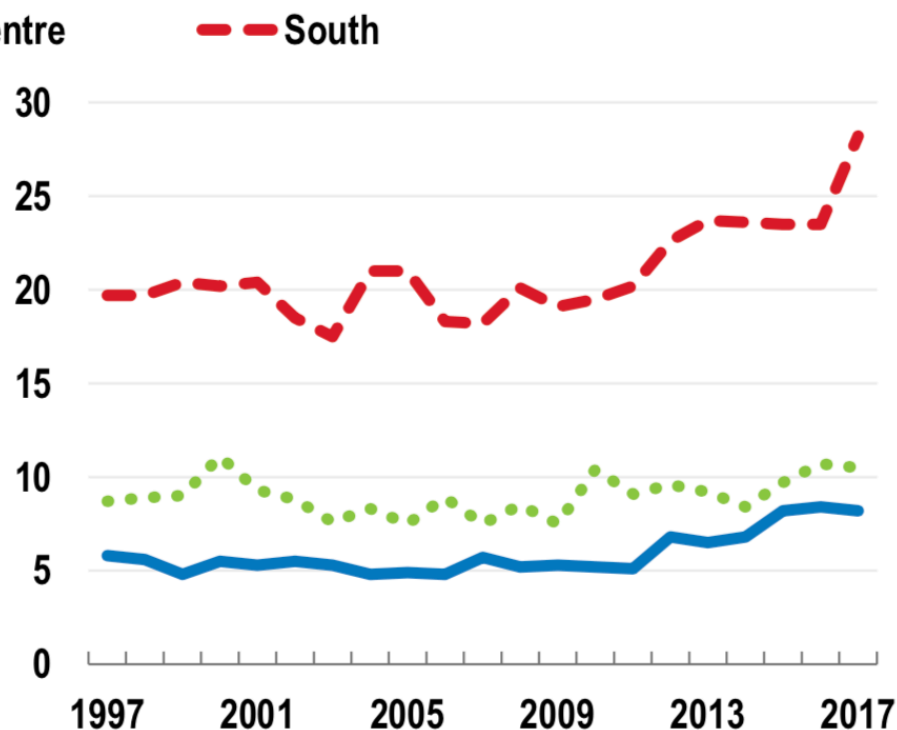
Italy's large regional disparities have widened

Employment rate and relative poverty rate

Employment rate
% of population, 15-64 year olds

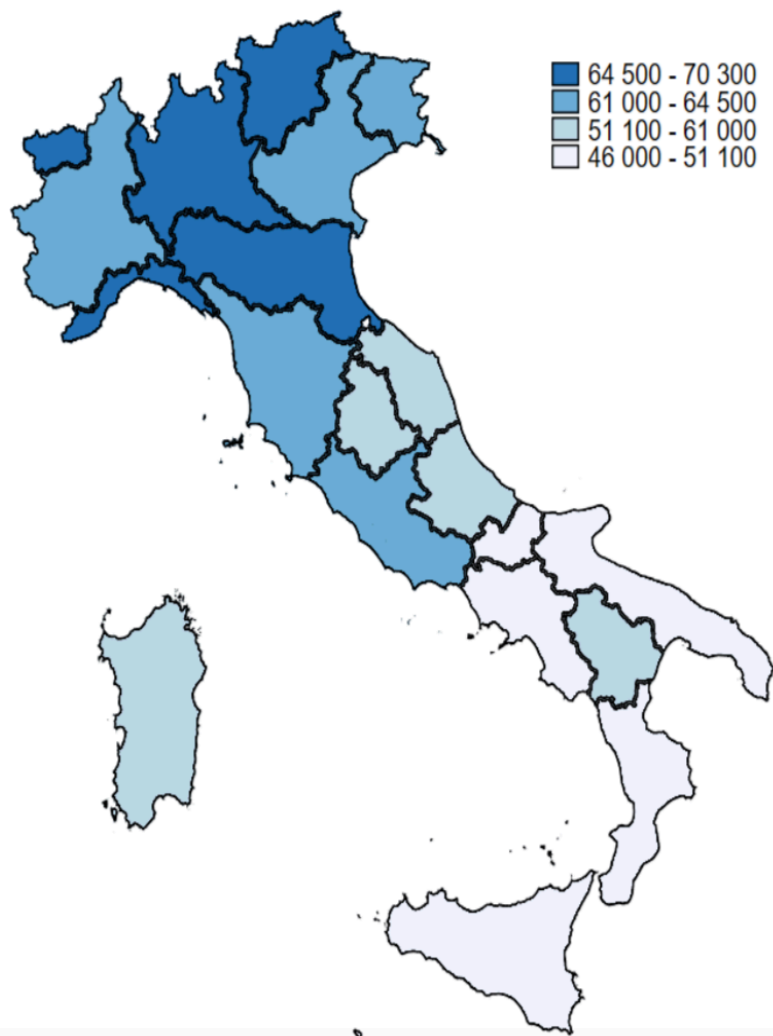


Relative poverty rate, % of persons living in households in relative poverty



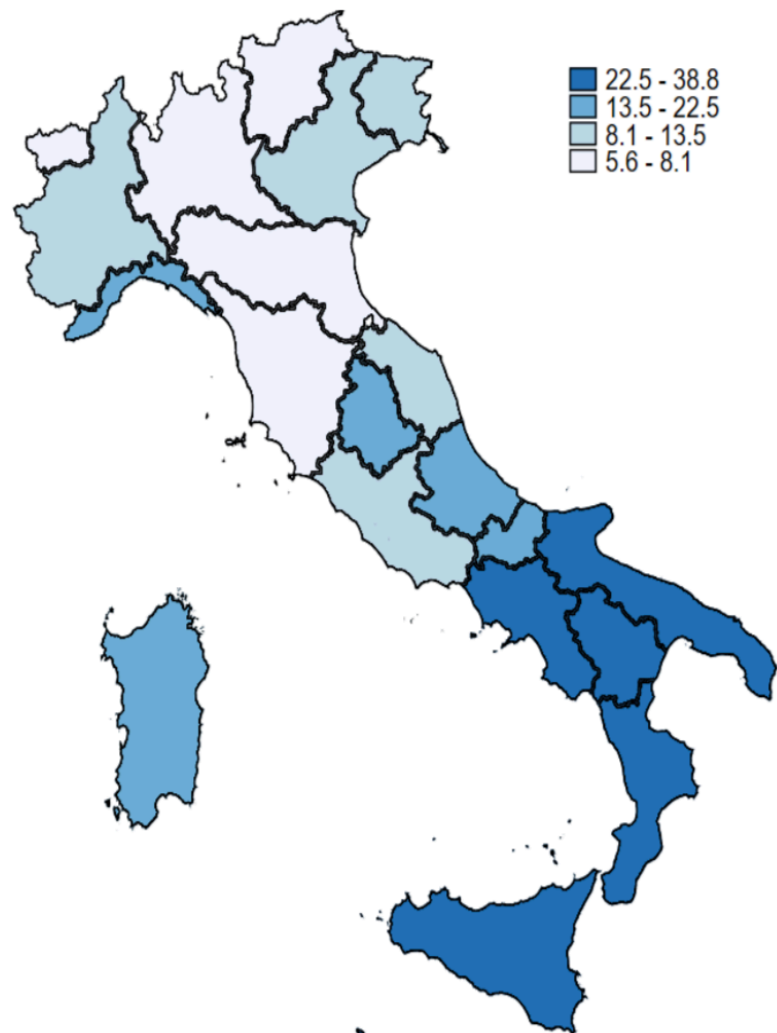
Value added per employee

EUR, 2016



Relative poverty rate

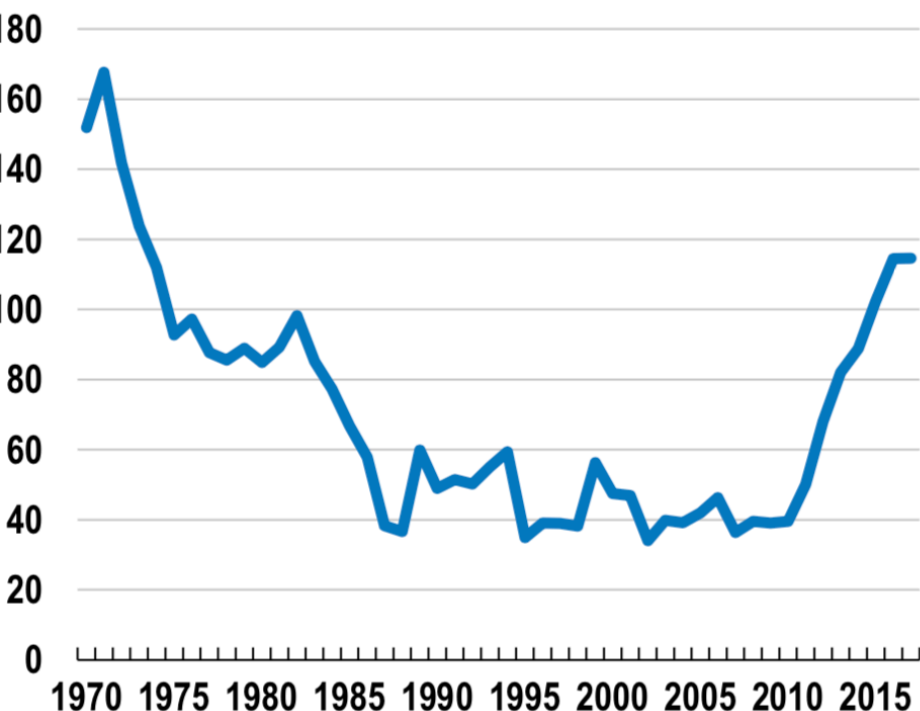
% of persons living in households in relative poverty, 2017



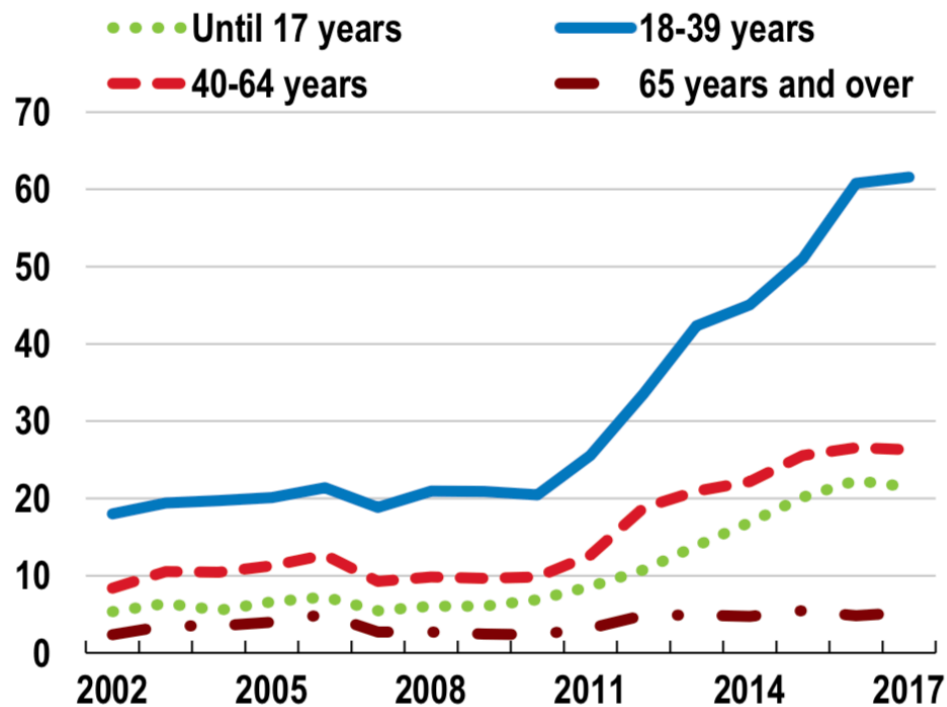


Rising numbers of the young are emigrating

Italian emigrants
Thousand of persons



Italian emigrants by age group
Thousand of persons



Another important characteristic of Italian industry (but also of the whole economy and society):

North – South divide

Graduatoria delle regioni italiane per valore delle esportazioni in base all'anno 2017 ^(*)

Pos.	Regione	2013		2014		2015		2016		2017	
		mln euro	peso %	mln euro	peso %	mln euro	peso %	mln euro	peso %	mln euro	peso %
1	Lombardia	108.096	27,7	109.546	27,5	111.341	27,0	111.961	26,8	120.334	26,9
2	Veneto	52.683	13,5	54.597	13,7	57.517	14,0	58.321	14,0	61.320	13,7
3	Emilia Romagna	50.797	13,0	52.972	13,3	55.308	13,4	56.143	13,5	59.881	13,4
4	Piemonte	41.400	10,6	42.770	10,7	45.789	11,1	44.489	10,7	47.906	10,7
5	Toscana	31.289	8,0	32.020	8,0	33.026	8,0	33.351	8,0	34.761	7,8
6	Lazio	17.704	4,5	18.490	4,6	19.046	4,6	19.624	4,7	22.995	5,1
7	Friuli Venezia Giulia	11.437	2,9	12.018	3,0	12.457	3,0	13.255	3,2	14.857	3,3
8	Marche	11.608	3,0	12.497	3,1	11.377	2,8	12.020	2,9	11.781	2,6
9	Campania	9.609	2,5	9.477	2,4	9.718	2,4	10.083	2,4	10.488	2,3
10	Sicilia	11.201	2,9	9.672	2,4	8.550	2,1	7.102	1,7	9.258	2,1
11	Abruzzo	6.733	1,7	6.934	1,7	7.447	1,8	8.167	2,0	9.003	2,0
12	Trentino Alto Adige	7.125	1,8	7.268	1,8	7.806	1,9	7.820	1,9	8.469	1,9
13	Puglia	7.952	2,0	8.139	2,0	8.094	2,0	7.936	1,9	8.262	1,8
14	Liguria	6.422	1,6	7.081	1,8	6.805	1,7	7.356	1,8	7.955	1,8
15	Sardegna	5.373	1,4	4.650	1,2	4.723	1,1	4.209	1,0	5.380	1,2
16	Basilicata	1.031	0,3	1.148	0,3	2.941	0,7	4.522	1,1	3.918	0,9
17	Umbria	3.644	0,9	3.427	0,9	3.646	0,9	3.653	0,9	3.886	0,9
18	Valle d'Aosta	573	0,1	607	0,2	605	0,1	566	0,1	681	0,2
19	Calabria	353	0,1	325	0,1	375	0,1	415	0,1	469	0,1
20	Molise	338	0,1	361	0,1	491	0,1	526	0,1	400	0,1
Diverse o non specificate		4.863	1,2	4.869	1,2	5.228	1,3	5.751	1,4	6.102	1,4

Italian SMEs are also involved in exports
and other forms of internationalisation,
usually occupying market niches

Are Labour costs too high in Italy?

Table I. Hourly Compensation Costs in Manufacturing

U.S. dollar basis, 2015

	Direct Pay	Total Compensation Costs	Change Relative to United States, 2000-2015 (percentage points)
Brazil	\$5.53	\$7.97	22
Canada	\$24.64	\$30.94	12
France	\$26.17	\$37.59	17
Germany	\$33.24	\$42.42	12
Italy	\$22.61	\$31.48	25
Japan	\$19.33	\$23.60	-6
South Korea	\$18.20	\$22.68	56
Mexico	\$4.14	\$5.90	-17
Taiwan	\$8.07	\$9.51	-8
United Kingdom	\$26.87	\$31.44	6
United States	\$28.77	\$37.71	NA

Two main characteristics of Italian industry:

1. Small size of Italian firms

2. Specialisation in tradition (low tech) sectors (lack of high tech)

1. Firm dimension

Dimension is important for the growth of productive sectors?

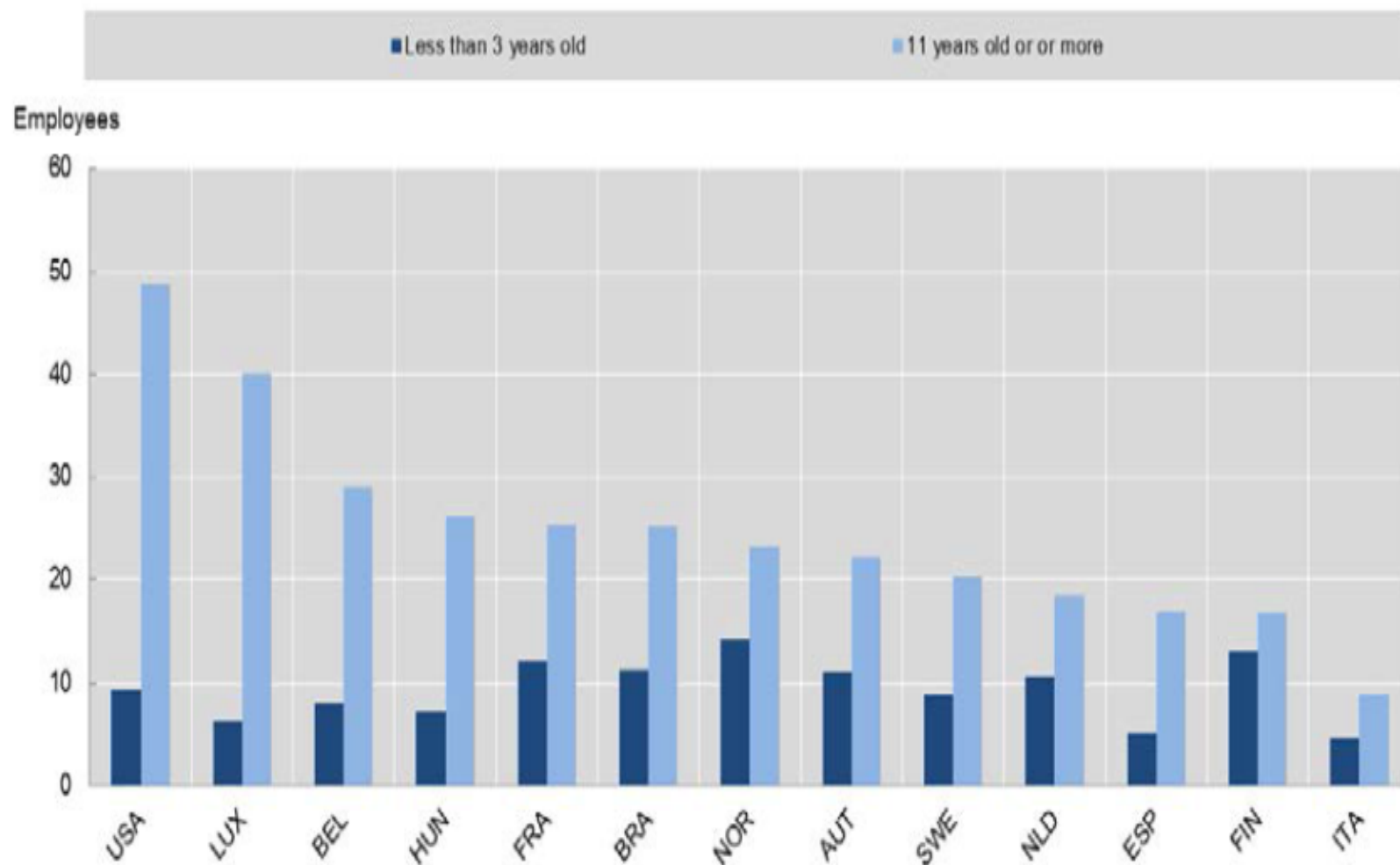
Neoclassical theory: yes, because large dimension allows to exploit scale economies and higher innovation

Knowledge economy: the flexible production systems than can change products more quickly and at lower costs are more appropriate

⇒ Small firms can be competitive, especially when they collaborate

⇒ However, countries where industry is competitive on the world market generally have large dynamic firms (F, G, also Finland, with Nokia) that lead other sectors' growth

Figure 9. Average size of firms less than 3 years old and 11 years old or more, 2001-10
Non-financial business sector, reference cohorts 2001, 2004 and 2007



- % of firms with less than 10 employees in Italy compared with other EU countries:
94% RU
93% F
95% Italy
- However Italy is different from two main aspects:
 1. Polarisation: few large firms which in other countries are the leaders of the productive structure; few medium firms

Does this mean that size does not matter in Italy?

There are two arguments in favour of the fact that size is not that important in Italy:

(i) Groups

Definition: group = set of companies legally distinct that are linked by ownership or contractual relationships under a top

Each firm must follow the strategy of the group but has legal autonomy.

Various types of groups:

- Horizontal group: various firms depend on a top firm
- Hierarchical group: relationships are both direct and indirect, forming a hierarchy

⇒ Italy: hierarchical groups prevail:

80% of firms > 500 employees belong to a group.

69%	250 – 500 empl
-----	----------------

50%	100 – 250 empl
-----	----------------

39%	50 – 99 empl
-----	--------------

22%	20 – 49 empl
-----	--------------

2%	< 20 employees
----	----------------

Advantages of being in a group:

- Firms control some activities even if they do not own them
- Higher autonomy than when the firm is a division of a large firm => higher incentives (responsibility for the results)
- Scope economies between the group's firms
- Management of a set of brands (synergies; scale economies in some function; lower risk, etc.)

(ii) Districts

= production system made of firms which collaborate

Italy: 141 industrial districts (Istat)

Specialisation: generally traditional (low tech)

industries (textile and clothing, mechanics, wood products, etc.), apart from a few case such as
Mirandola biomedical district.

⇒ Is industrial district a model which will remain competitive?

2. Productive specialisation in Italy

What is specialisation? Why is it important?

Definition: specialisation = concentration of a country's production in specific sectors

Economic theory: 3 reasons why specialisation is important

(i) Comparative advantages

In each countries there are different sectors with different levels of productivity, with different production techniques

- ⇒ Each country should specialise in sectors where production costs are relatively lower
- ⇒ What matters is to specialise, not in what sector the country is specialised
- ⇒ Consequence: international trade should be characterised by exchanges of different goods across countries
- ⇒ Not true: what is observed is trade of goods in the same sectors (intra-industry trade and not inter-industry trade)

(ii) Product differentiation:

Hypothesis: product differentiation and economies of scale

- ⇒ Firms specialise in different varieties of the same product
- ⇒ The pattern of specialisation matters: better specialisation in sectors with higher profit margins
- ⇒ Trade of different varieties of goods should be observed: not verified in reality, because countries trade same varieties of products
- ⇒ None of the above theories allow to explain why similar countries (in terms of GDP, population) have so different productive structures

(iii) **New economic geography:**

- ⇒ Explain geographic agglomeration of economic activities as a function of externalities (scale economies and spillovers across sectors) and congestion effects
- ⇒ Firms concentrate activities where conditions for production are better (resource costs and quality) when production factors are mobile

However,

- Factors are not perfectly mobile
- Firms have different production sites

⇒ The typology of sectors existing in a country depends on different factors:

1. Resources: raw material, human capital, etc.
2. Competitive environment (degree of competition, number of rivals, ...)
3. Government policies (industrial and technological policies, regulation, etc.)
4. History of the country (knowledge base accumulated through time)
5. Entrepreneurship
6. Random element

Neffke, Boschma, etc.

At territorial level, too much specialisation can lead to **lock-in**

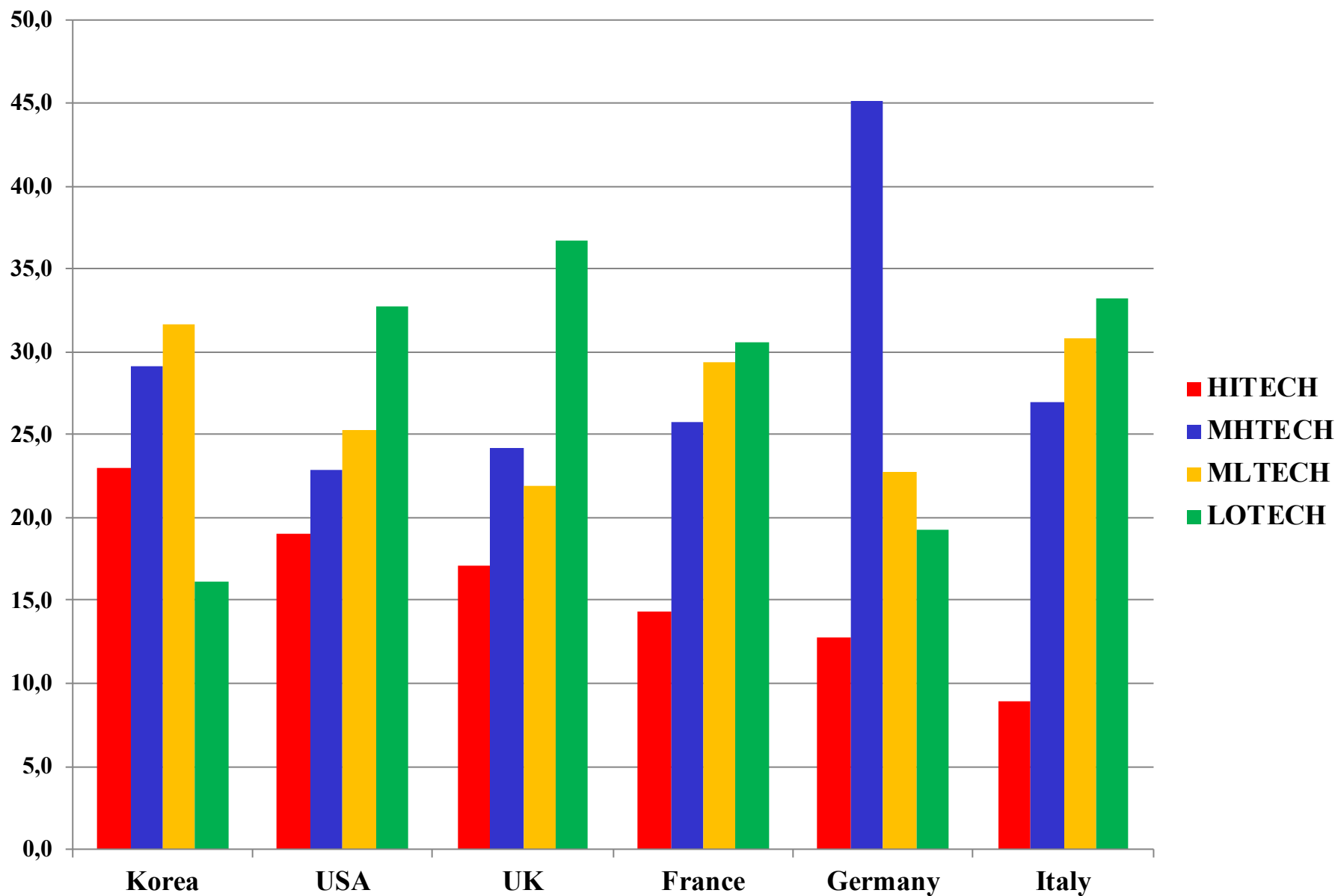
Better is to have **related variety**: different sectors with potential cross-fertilisation

Confrontation with other advanced
and emerging countries

Industrial sectors can be classified into:

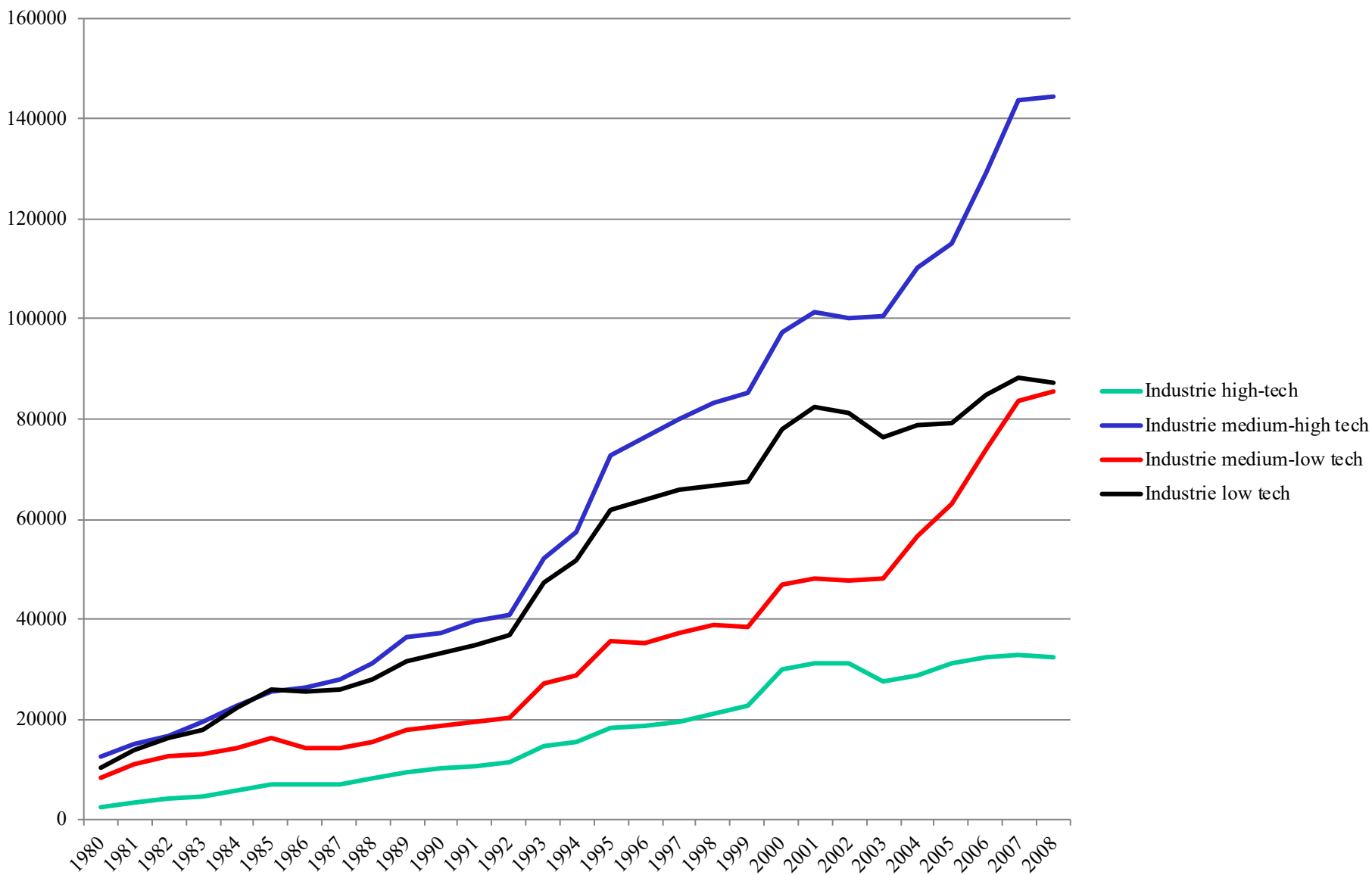
- Low tech: sectors with low technological intensity (use few technology, science, little skills: food products, clothing and textile, leather and leather goods, wood products, pulp and paper;
- Medium-low tech: intensity in technology is medium-low: oil and nuclear products, plastic products, basic metal goods, shipbuilding and repair;
- Medium-high tech: intensity in technology is medium-high: machines, motor vehicles, chemical products except pharmaceuticals;
- High tech: high intensity in technology, pharmaceuticals, ICT products, software, radio and TV products, medical instruments, optical goods, space and aircraft production.

Share in manufacturing value added



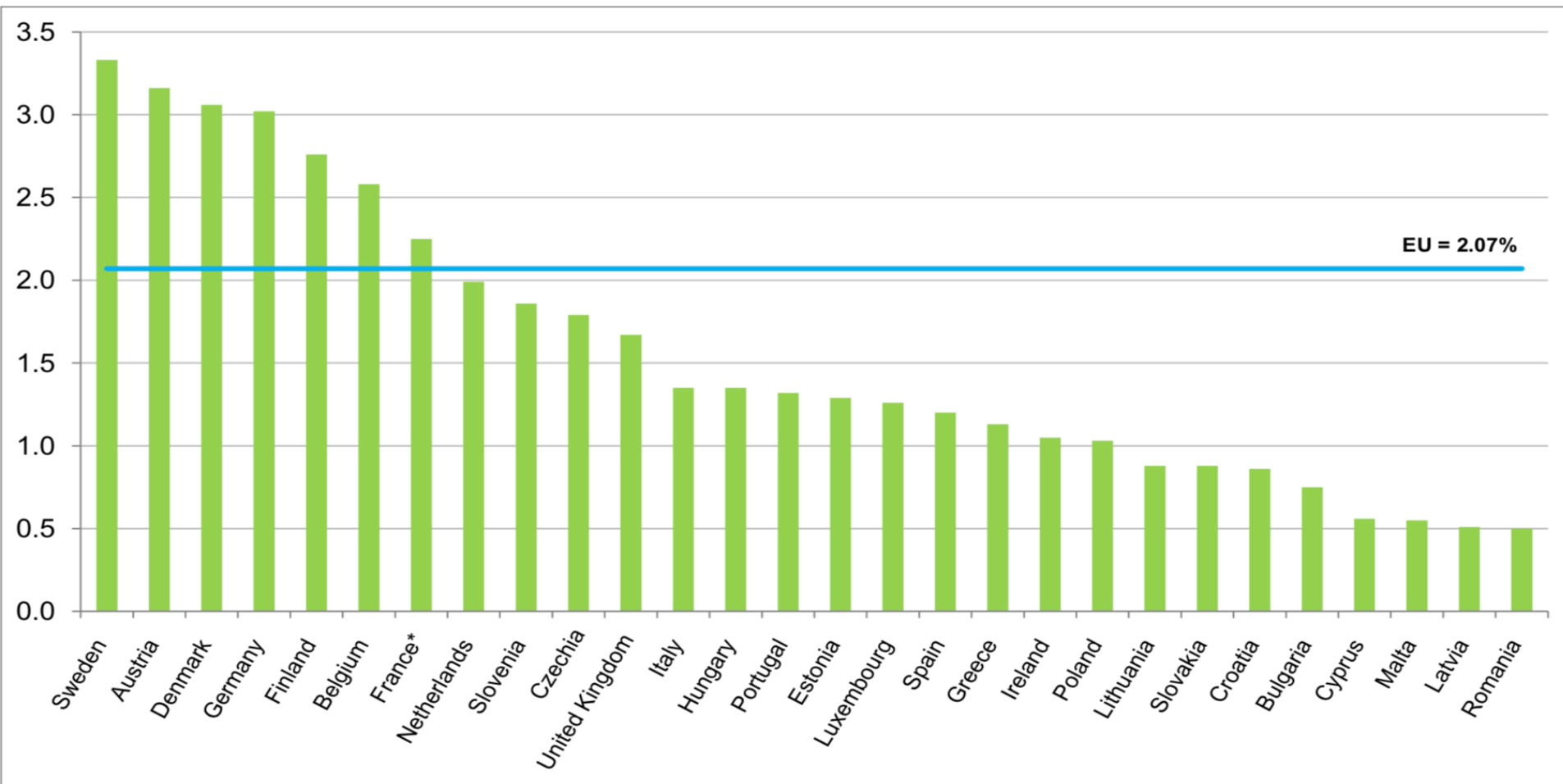
- ⇒ European countries but also the USA maintain specialisation in low tech: UK and USA due to boom in printing and publishing industry; France: food industry;
- ⇒ The UK and France have comparative advantages in high tech
- ⇒ Germany is particularly strong in medium-high tech
- ⇒ Italy is particularly strong in low tech, and particularly low in high tech
- ⇒ Korea (emerging country) has highest share in high tech!

Italian exports



R&D intensity in the EU Member States, 2017

(R&D expenditure as % of GDP)

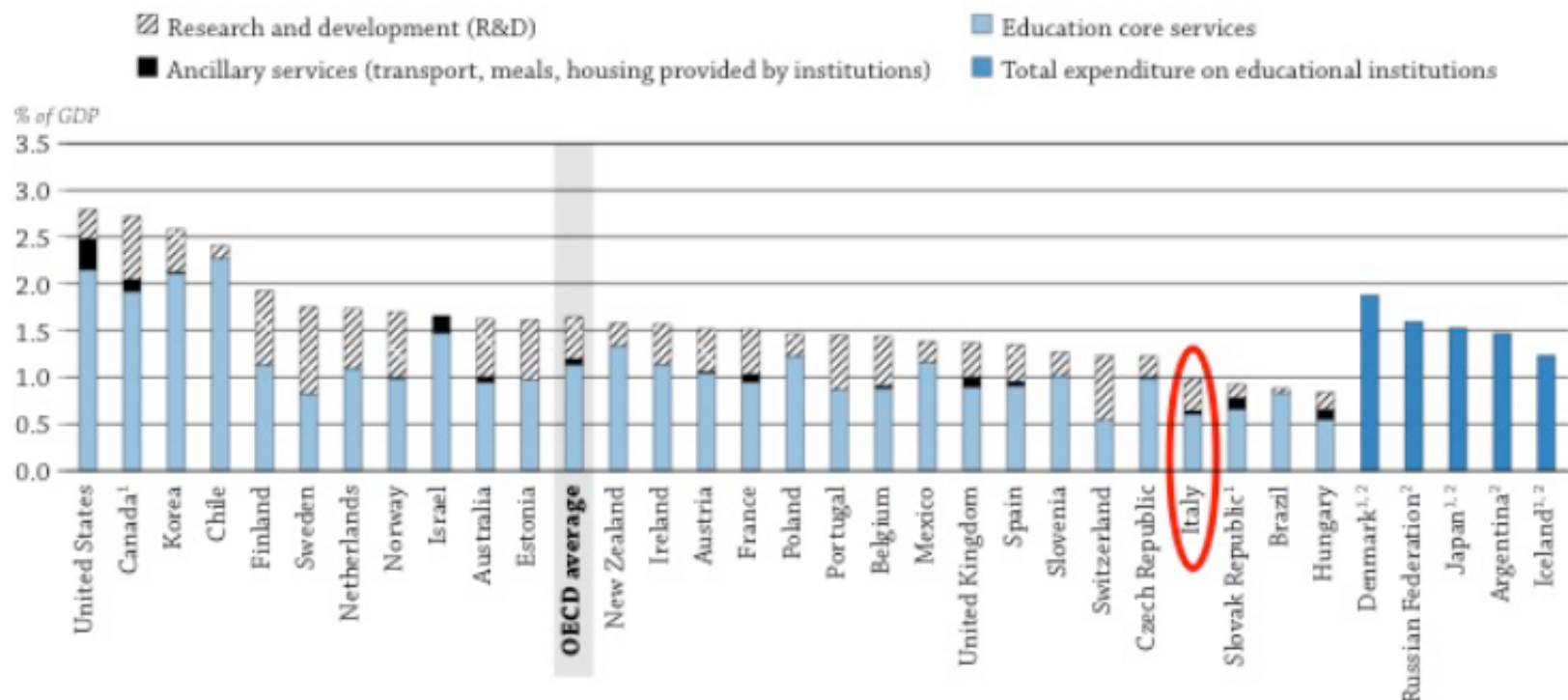


* 2016 data instead of 2017

R&D expenditure slightly increase in Italy thanks to private firms (public R&D expenditure remain stable)

Spesa per università (% PIL): l'Italia è 30° su 33 (fonte: OCSE 2013)

Chart B2.4. Expenditure on educational institutions for core services, R&D and ancillary services as a percentage of GDP, at the tertiary level of education (2010)



1. Some levels of education are included with others. Refer to "x" code in Table B1.1a for details.

2. Total expenditure at the tertiary level including expenditure on research and development (R&D).

Countries are ranked in descending order of total expenditure on educational institutions in tertiary institutions.

Source: OECD. Argentina: UNESCO Institute for Statistics (World Education Indicators Programme). Table B2.4.

See Annex 3 for notes (www.oecd.org/edu/eag.htm).

StatLink  <http://dx.doi.org/10.1787/888932846937>

⇒ Italian industry specialisation is wrong?

NO if:

1. World competition is not more intense in traditional sectors;
2. Traditional sectors have strategies to face competition

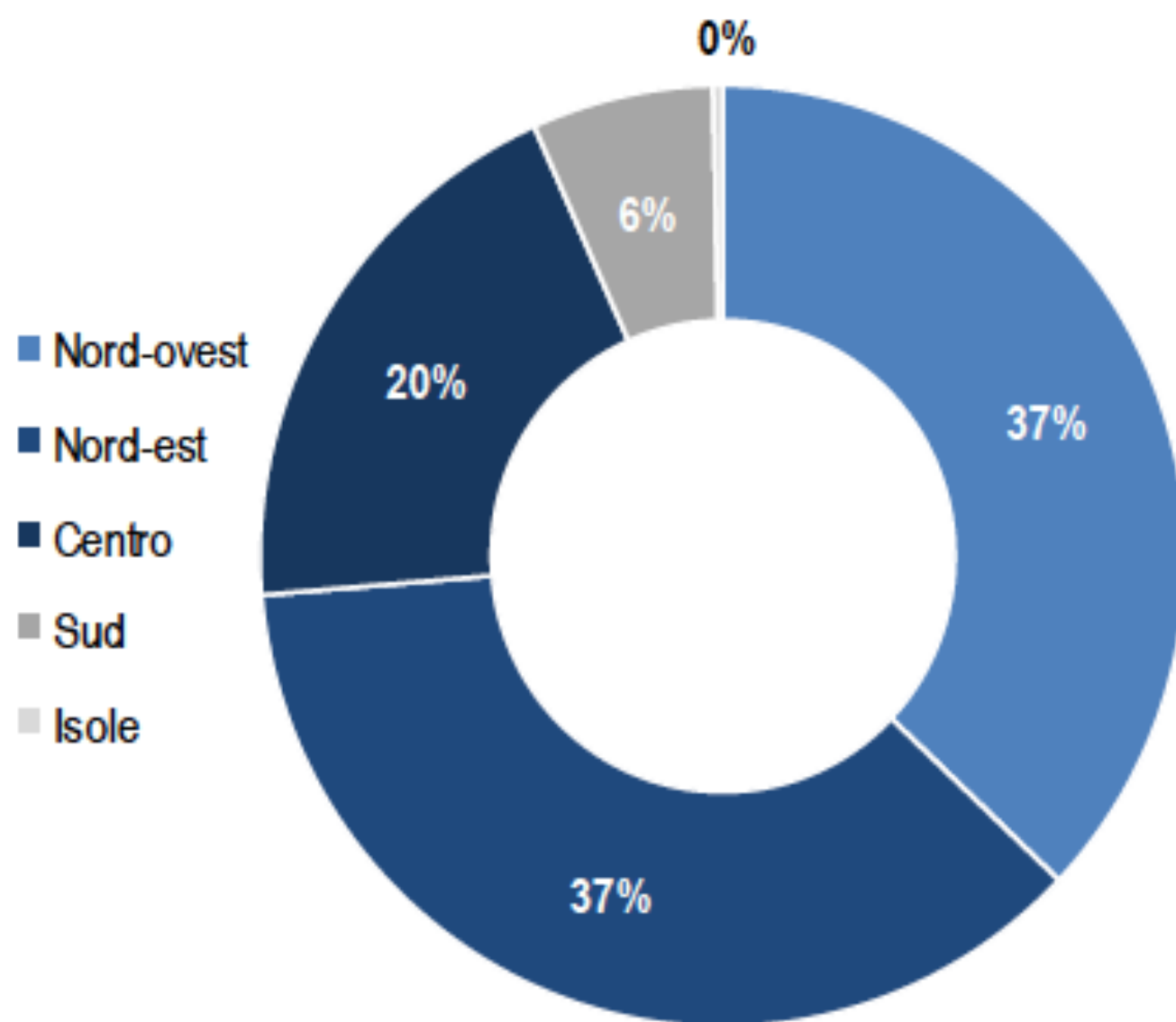
In fact:

1. Competition is more intense in traditional sectors, in that developing and emerging countries produce in these sectors with a cost advantage (labour cost)
2. Italian firms in traditional sectors which remain competitive move to higher market segments (higher quality and creativity)

- ⇒ The problem is that firms from developing and emerging countries may be able to move to higher market segments too
- ⇒ Given the high investment in human capital and innovative capacity, this move could arise soon
- ⇒ Italy should develop capacity of technological development to support traditional sectors' upgrading as well as the development of new sectors

FOCUS ON DISTRICTS

Addetti nei distretti industriali per ripartizione

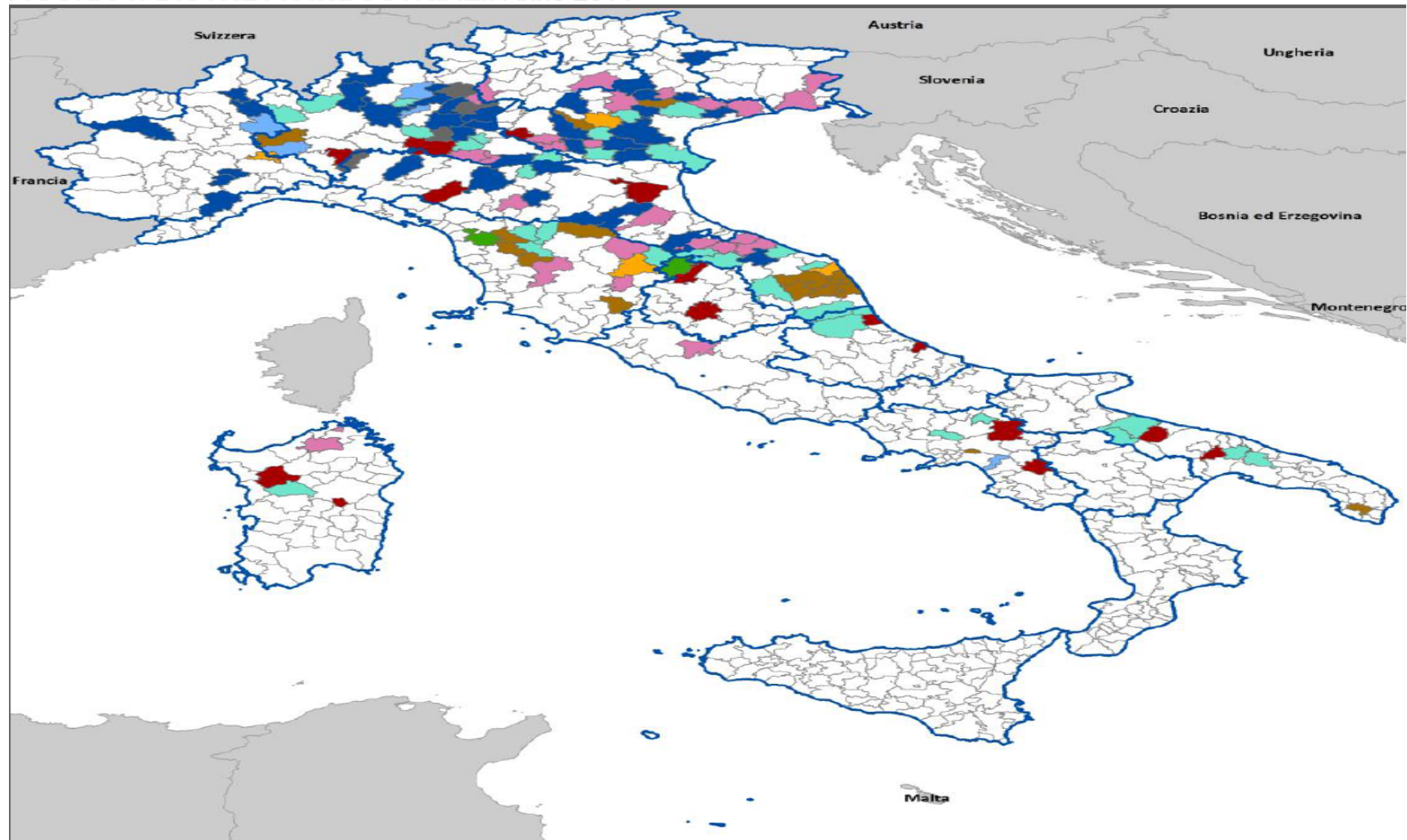


	Numero			
	2011	2001	Var. 2011/ 2001	Var.% 2011/ 2001
Distretti	141	181	-40	-22,1
Unità locali	1.152.429	1.104.663	47.766	4,3
Addetti	4.887.527	4.802.081	85.446	1,8
Unità locali manifatturiere	164.737	210.081	-45.344	-21,6
Addetti alle unità locali manifatturiere	1.504.490	1.904.066	-399.576	-21,0
Numero di comuni	2.121	2.275	-154	-6,8
Popolazione	13.326.320	12.276.845	1.049.475	8,5

PROSPETTO 3. DIMENSIONE MEDIA PER DISTRETTO INDUSTRIALE AI CENSIMENTI. Anno 2011 e 2001, valori assoluti

Dimensione	2011	2001
Numero di comuni	15	13
Popolazione residente	94.513	67.828
Unità Locali	8.173	6.103
Addetti alle Unità locali	34.663	26.531
Addetti ogni 100 abitanti	37	39
Unità locali manifatturiere	1.168	1.161
Addetti manifatturieri	10.670	10.520

FIGURA 1. DISTRETTI INDUSTRIALI. Anno 2011



Industria principale

	SLL non distrettuale (470)
	Tessile e abbigliamento (32)
	Pelli, cuoio e calzature (17)
	Beni per la casa (24)
	Gioielleria, oreficeria, strumenti musicali, ecc. (4)
	Industria alimentare (15)
	Industria meccanica (38)
	Industria metallurgica (4)
	Industria chimica, petrolchimica e prodotti in gomma (5)
	Industrie cartotecniche e poligrafiche (2)

Focus on Italian industrial districts

Evolution in the last 10 to 20 years?

Fear regarding the Made-in-Italy sectors

- These sectors face the competition from countries with low labour costs
- These sectors have low growth potential

These fears have been expressed for more than 30 years but Italy has maintained market shares in these sectors in the meantime.

However this does not mean that they will continue being competitive in the future: current structural changes are quicker and wider than in the past

How has the Made in Italy sector maintained competitiveness till now?

1. Increase in the quality of products
2. Increase in the intangible content of products (innovation on materials, style and design)
3. Higher variety and reduction in the product life cycle
4. Organisational innovations in the district form of organisation (emergence of leader(s), hierarchisation, teams)
5. Internationalisation not only of sales but also of production

DISTRICTS AND CLUSTERS: DEFINITIONS

CLUSTERS = geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions

= general concept, include all types of agglomerations, from groups of SMEs to large firms and their suppliers

INDUSTRIAL DISTRICTS = geographic concentration of SMEs characterised by a division of labour between the firms: the production process is realised by the team of firms, each realising a particular production phase



Industrial districts: are they still competitive?

There are many studies in the literature on the recent evolution of districts and on their performance.

The evidence can be summarised in two points:

1. Industrial districts are facing deep structural changes
2. There are experiencing deep re-organisation as a result, making them looking less like “districts” and more like clusters: the number of firms generally reduce in the districts, especially small and very small firms disappear, and medium-large firms, from within or external to the district, take the role of leaders.

Before the crisis

Analysis by the Bank of Italy on census and survey data:

1. SIZE OF DISTRICTS

- 2001 – 2006: decrease in the number of employees by 7%, against reduction of 6% in non district firms;
- Share of labour force employed in industrial districts: 15.2% in 1970, 23.9% in 1991, 23.7% in 2001 and 22.6% in 2006

=> Not dramatic fall but stagnation

2. SIZE OF DISTRICT FIRMS

- Decrease in the number of small and very small firms
- Consolidation of one or more leaders (larger firms) which concentrate a higher share of the district's revenue
- The share of medium to large firms in % of district revenue has grown by 7% the North of Italy, 13% in the Centre of Italy.

3. SPECIALISATION

- In most districts, reduction in the share of revenue stemming from the main specialisation (= evidence of diversification?)

4. ORGANISATION

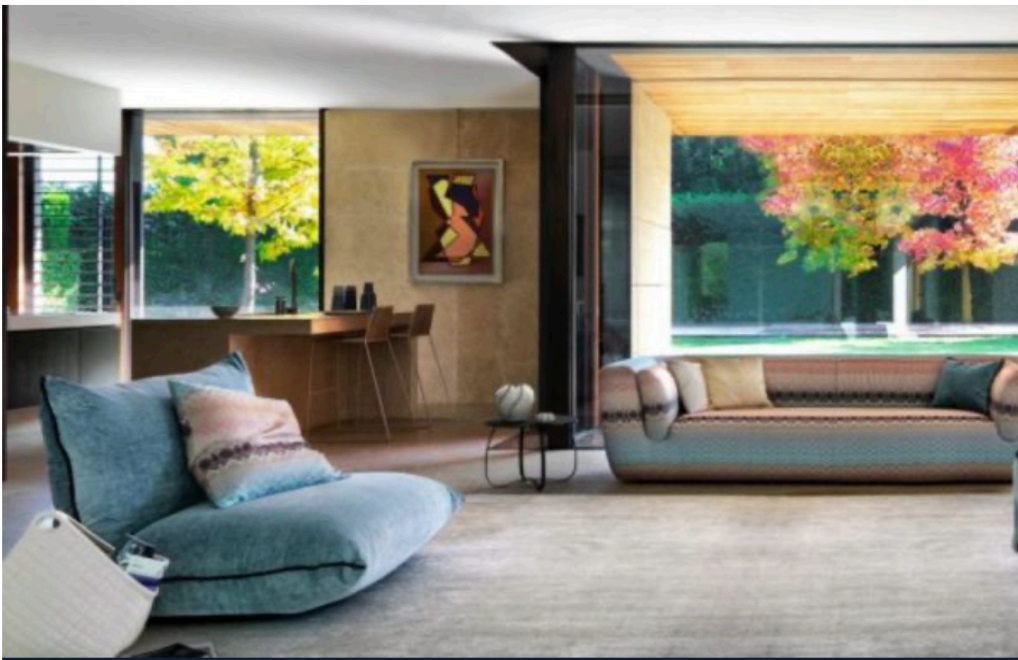
Links between firms and between firms and the local territory seem to weaken (Iuzzolino and Micucci, 2001)

HOWEVER, ITALIAN INDUSTRY HAS SOME STRENGTHS...

Italy has advantages in particular niches.

Example: Italian firms are strong in **design and brands** (trademarks), particularly in the textile and clothing sector.

Italy is one of the world leaders in design of transport vehicles: boats and ferries, motorcycles



Sponsored content

How Italy became (and remains) a creative superpower

(Australian website Domain,
accessed March 2020)



Figure 11. Product innovation, by R&D status, 2008-10
 OECD, based on Eurostat (CIS-2010) and national data sources, June 2013

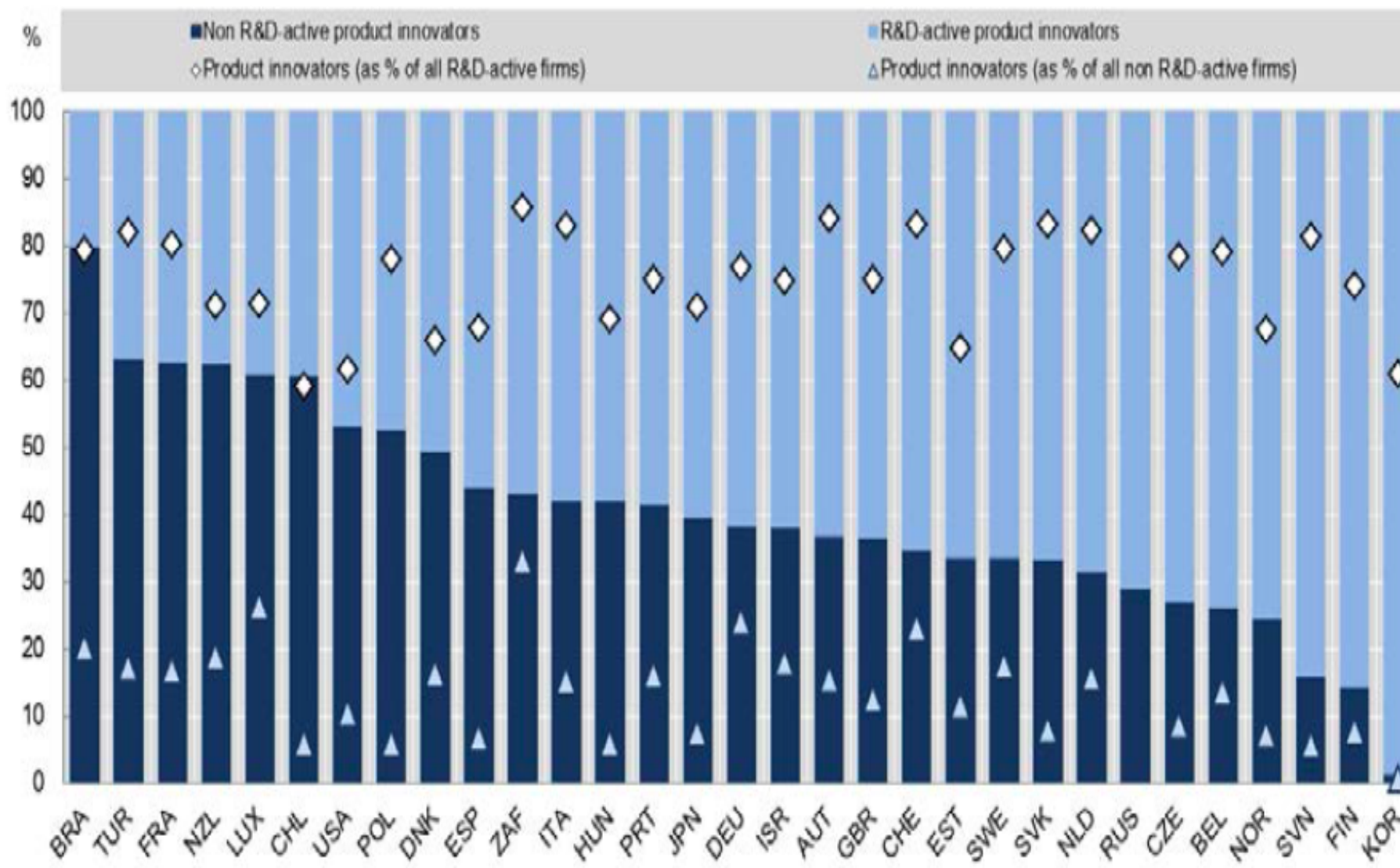
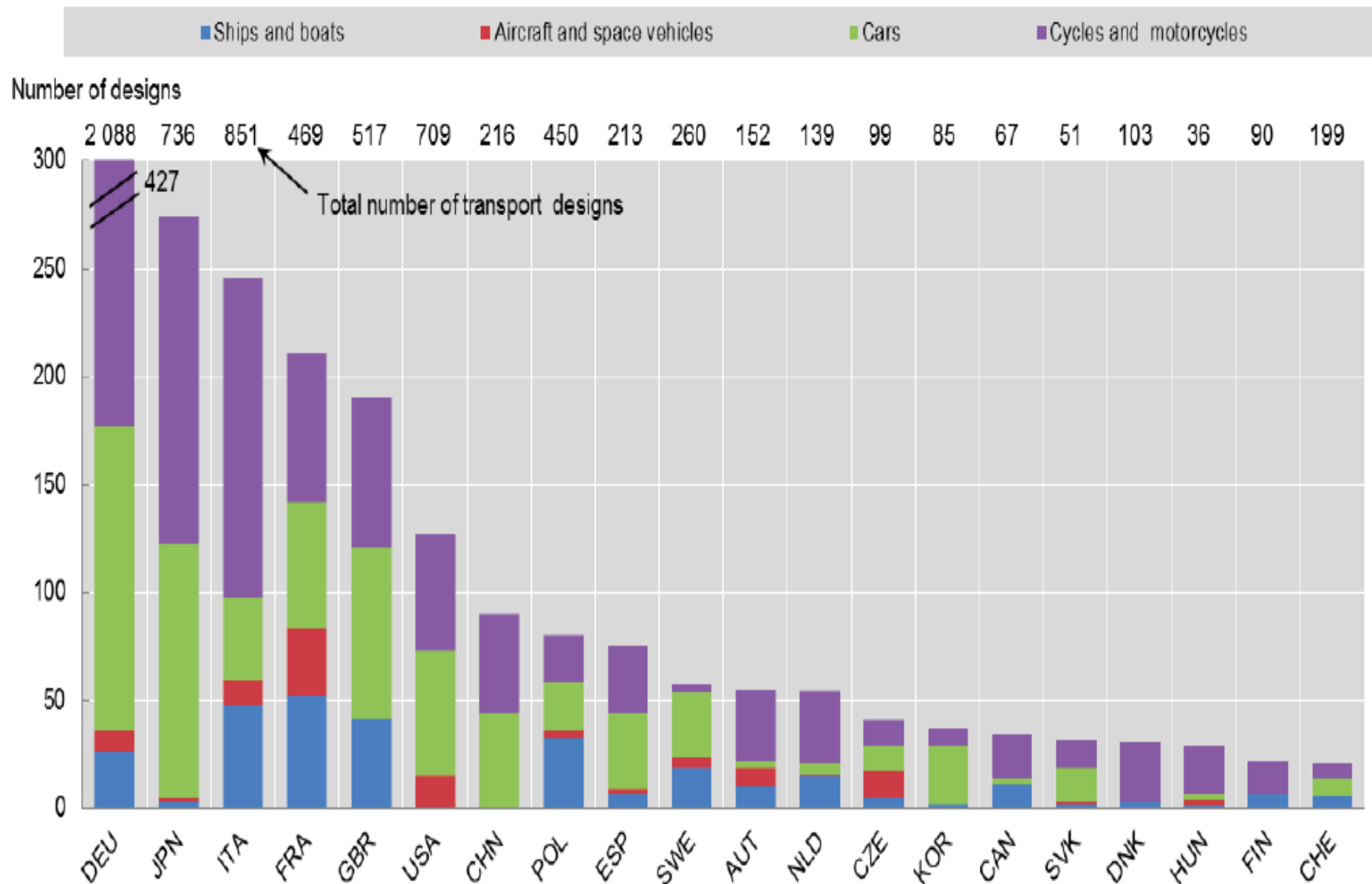


Figure 15. Transport-related designs, 2010-2012
Registered community designs, top 20 applicants



A case of success
The biomedical Mirandola district
(Labory, 2014, 2016)

Aims of study

- Analysis of the role of external knowledge flows in the upgrading of the Mirandola cluster in Italy
- Upgrading (Humphrey and Schmitz)
 - = improvement in product, processes, functions or inter-sectoral flows
 - = structural adjustment to changing competitive conditions
- Here focus is on product and process upgrading, analysed through evidence on innovative activities

Mirandola

- **Cluster** (not really districts due to organisation and presence of large firms) created in the early 1960s by an entrepreneur (Veronesi) who creates the first productive firms
- Sector: biomedical
- Product specialisation: disposables to be used in medical surgery (79% of district revenue) + electro-medical machines
- Increasingly specialisation is shifting from disposables to electro-medical machines

Industrial structure in Mirandola

2009: 292 firms in core business (Consobimed)
= more than 20% of the whole biomedical sector in Italy

Most firms are SMEs (94.7% below 50 employees)

But the district is characterised by the presence of **multinationals** (external leaders) who entered the district by acquisition of local firms

5 main multinational groups:

Gambro (Sweden), B.Braun (Germany), Mallinckrodt (USA), Fresenius (Germany), Sorin (Italy)

Innovation in Mirandola

- District upgrading across time thanks to **innovation**: product and process (introduction of new products and new machines to produce them)
- Trend in production of disposables: rationalisation with delocalisation of manufacturing to lower cost countries: the multinational Baxter left the district in 2004, shifting the production of disposables to Malta

Innovation in electromed

- Production of electro-medical equipment: importance is growing in the district; more value-creating than disposables
- Multinationals create new products in this field using global networks of R&D centres
- Mirandola has managed to remain a node in these global networks (thanks to **innovative capacities**)

Innovation in electromed

⇒ how?

Are there specific labour resources locally?

Is it because the cluster firms are able to collaborate particularly well?

Is it because they are able to create linkages with other research institutions locally, in the rest of Italy or abroad?

Is the Emilia-Romagna regional innovation system working so well as to help?

Hypotheses we want to check

1. Do biomed firms in Mirandola innovate more than biomed firms outside it? (is there a “cluster effect” in innovation?)
2. If not, is this evidence of diminishing advantages in clustering?
3. If yes, how comes?
 - role of multinationals?
 - role of internal vs external knowledge flows?
 - is this due to being a node in global networks?

DATA

AIDA Database: all firms in the electro-medical sector (ATECO 2007 26.60) located in the Emilia-Romagna region

Among these, firms in Mirandola are those located in the municipalities of the district

European patent office (Espacenet): all patents obtained by firms since 2000

ISI Web of Science: all publications of scientific articles in which the name of the firm appear in the authors' address (since 2000)

DATA

Final sample:

105 firms of which 21 are in Mirandola

Distortion: the sample does not have firms with less than 20 employees

⇒ We have the largest firms

⇒ caution needed, although the largest firms are also usually the most active in innovative activities (few firms of less than 20 employees obtain patents or scientific publications)

Figure 1. Number of articles and number of patents, 2000 to 2009

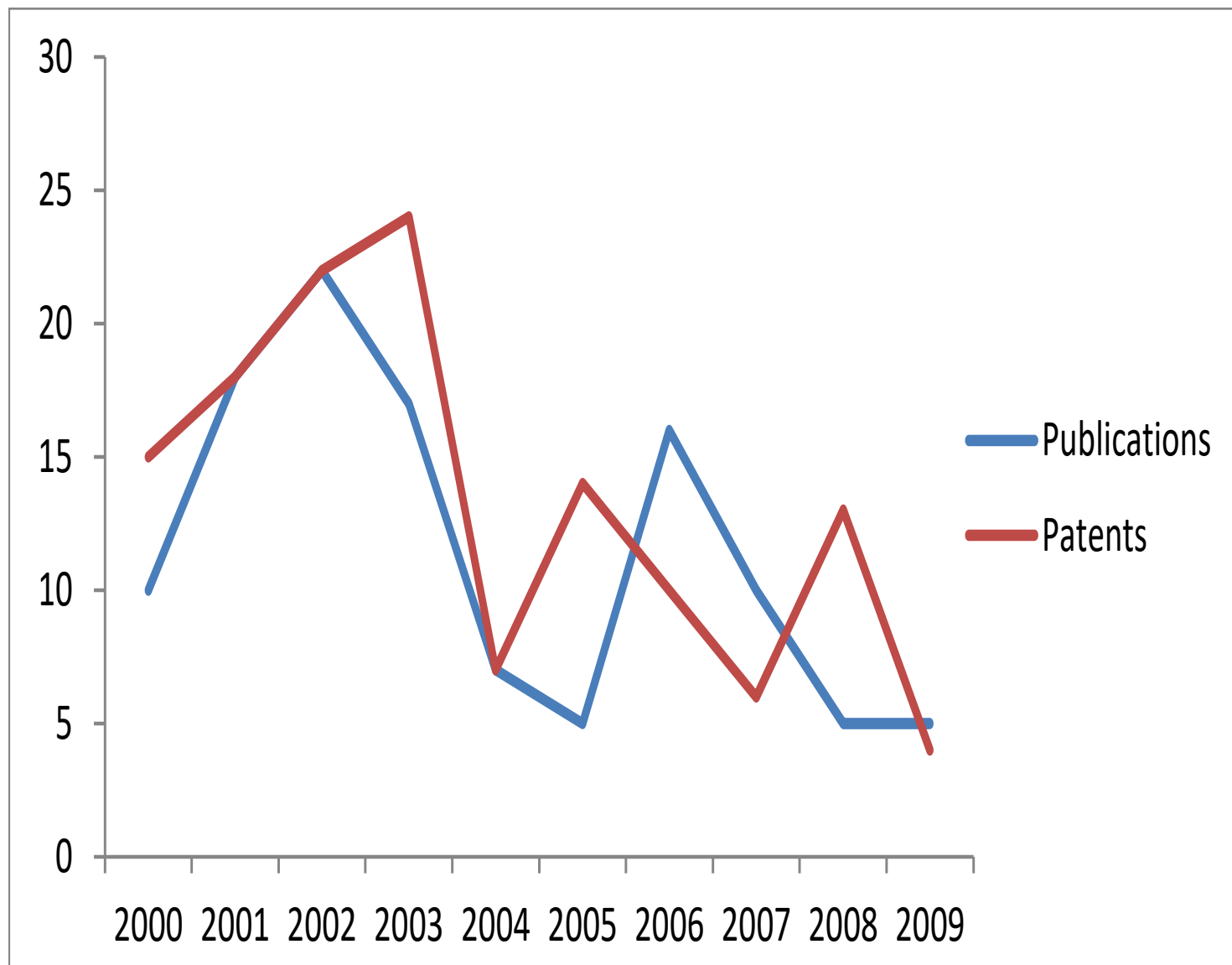


Figure 2. Number of patents in the ER biomedical sector, 2000 to 2009, whole region versus Mirandola.

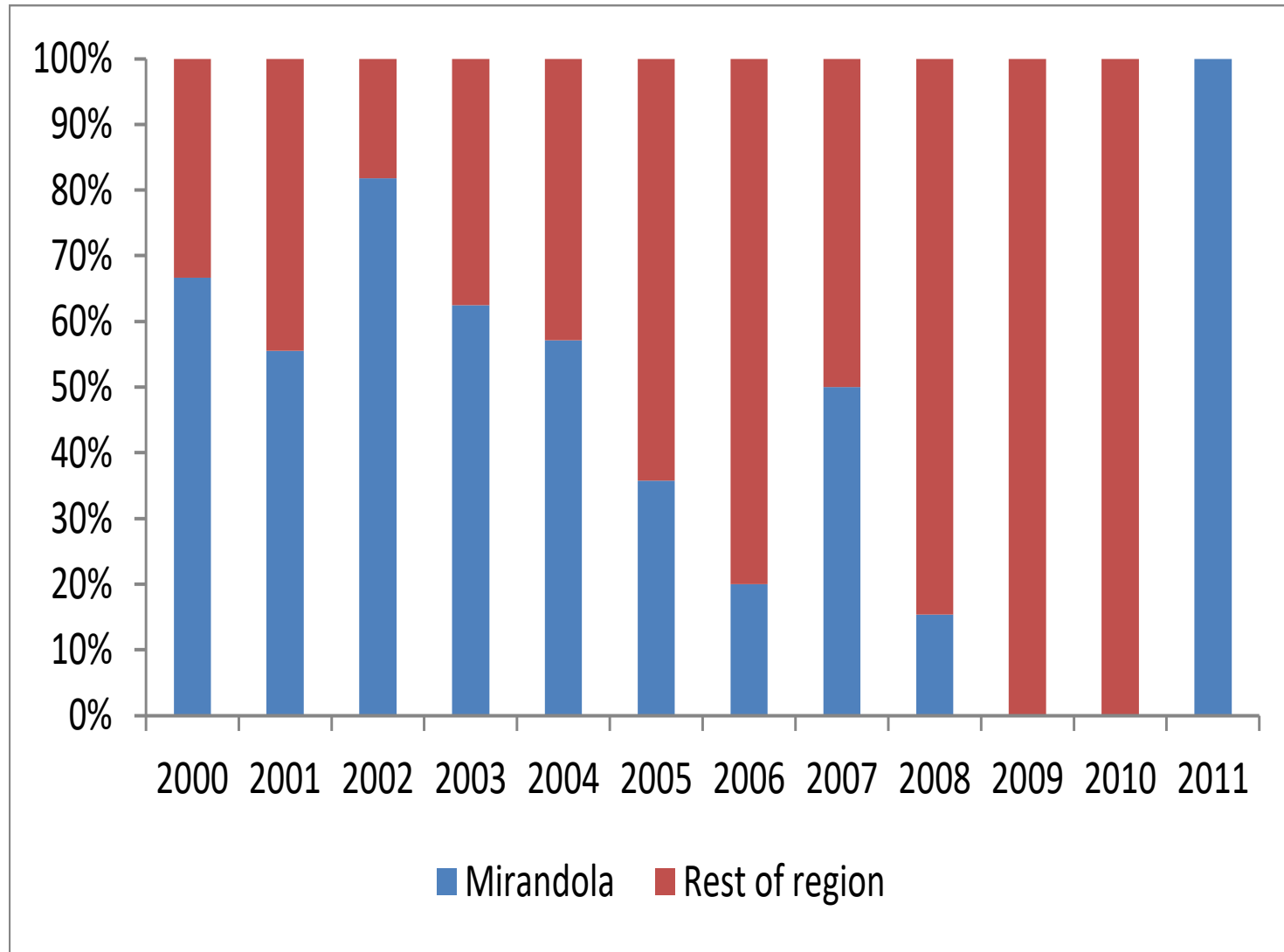
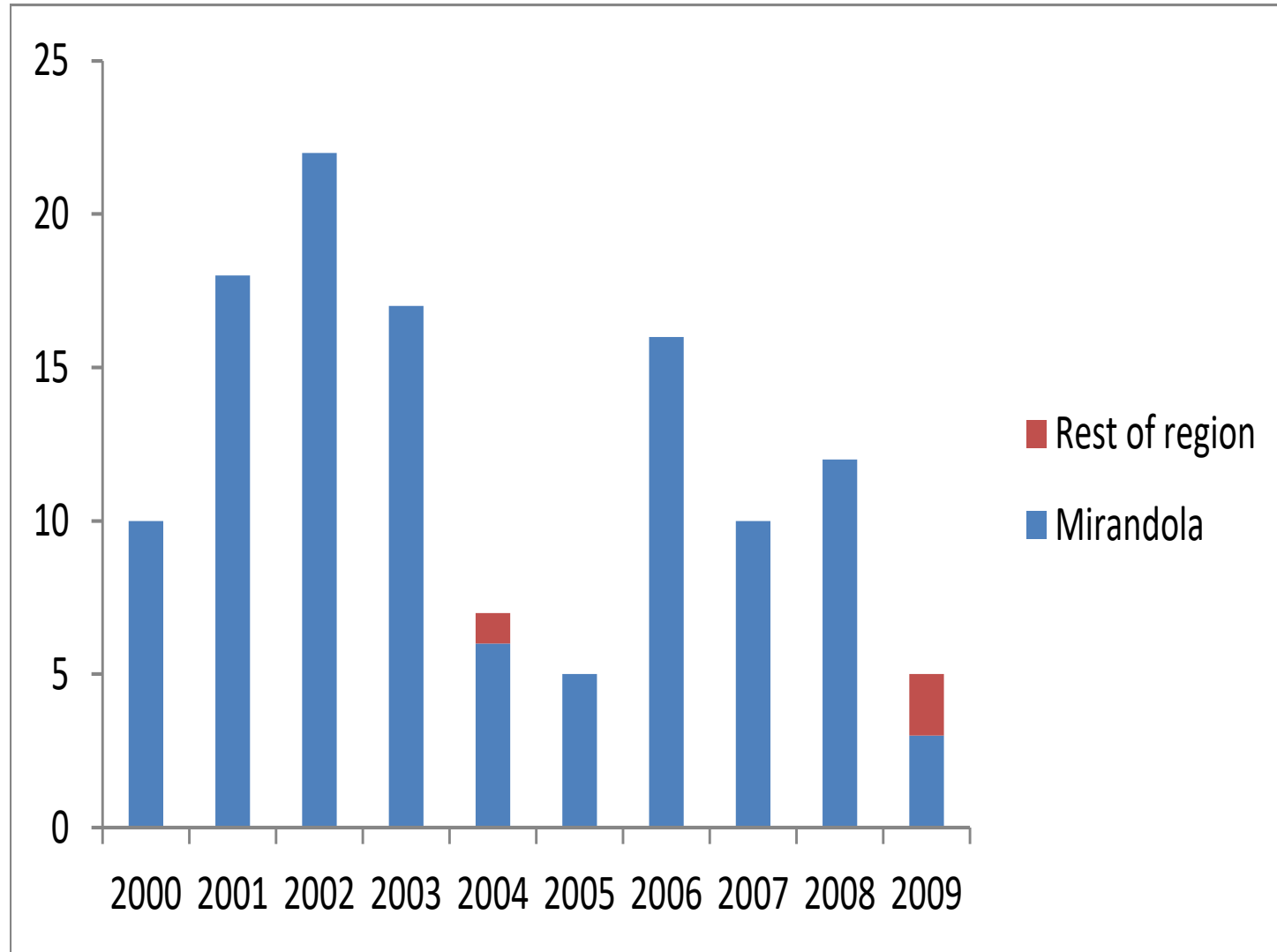


Figure 3. Number of scientific publications in the ER biomedical sector, 2000 to 2009, whole region versus Mirandola.



- Mirandola firms produce about half the patents obtained by the sector in the region: firms in the electro-medical sector in the rest of the region also obtain patents
- Mirandola firms produce almost all scientific publications of the sector and the region
- The district firms that publish papers in scientific journals are **the largest ones** (Gambro SPA; Fresenius Hemocare; Dideco SpA; Bellco Srl)

and the ones producing electro-medical machines

Scientific publications are usually taken as evidence of firms' willingness to build a reputation in the scientific community and to create relationships with the scientific community

Firms' scientific publications are increasing in all sectors

Firms increasingly publish research done jointly with authors from other institutions (especially universities)

The impact of firms' publications (impact factor or citations) increases with the geographical and institutional variety of collaboration

- ⇔ Scientific publications as evidence of importance of U-I relationships
- ⇔ Firms in the Mirandola district are more involved in U-I relationships than the other firms

Why?

- Multinationals may be more effective in building such relationships (availability of financial resources and of staff)
- Oldest firms in Mirandola are more prone to scientific publications

Methodology

- 1) Test of cluster effect: regression of the number of patents as a function of determinants, including location in district (and other variables)
 - 2) Scientific publications and collaboration: analysis of the research networks that emerge from co-authorship and effect of network characteristics on impact of publications (citation)
- ⇒ Count variables: negative binomial regressions

Table 4. Estimates of patenting

	Probit estimation on patenting dummy (1 if at least one patent obtained)	Poisson regression on number of patents	Negative binomial on number of patents
Dimensional class	.467 (0.003)*	0.715 (0.000)*	0.755 (0.014)*
Location in Mirandola district	.322 (0.354)*	1.409 (0.003)*	0.564 (0.483)*
Age	0.0005 (0.966)		
Number of publications		0.012 (0.111)*	0.067 (0.454)*
Number of observations	104	105	105
LR Chi2(3)	14.27	30.01 (Wald Chi2)	18.78
Pseudo R2	0.1220	0.3175	0.0777
Alpha			4.321°
Vuong test			1.37 (0.0855)

P-values ($P > |z|$) in brackets.

*Significant at 5 percent level;

° Likelihood-ratio test of $\alpha=0$: $\text{chibar2}(01)=151.00$; $\text{Prob} > \text{chibar2}=0.000$

⇒ There seems to be a “cluster effect” :
firms in the Mirandola district tend to
obtain more patents; being in the district
raises the probability of patenting by about
12%

Table 3. Collaboration on scientific publications. Percentage of collaborations including the specific institution.

Italian extra-regional hospital	36.0
University in the rest of Italy	14.8
Foreign university	9.9
Regional hospital	9.0
Foreign hospital	7.0
Regional university	6.4
Foreign firm	3.8
Foreign research centre	3.5
Italian extra-regional research centre	2.9
Regional firm	2.3
Regional research centre	1.5
Italian extra-regional firm	1.5
% of publications not including collaboration with any institutions	8.6

Table 5 - Estimates of the quality of publications

Variables	Model1	Model2	Variables	Model3
AUT	.118* (.043)	.053 (.257)	AUT	.110 (.049)
AUTSQ	-.0009* (.053)	-.0004 (.234)	AUTSQ	-.0009 (.041)
UNIVERSITY	.429* (.264)	.55 (.110)*	Regional university	-.557 (.165)
RESEARCH CENTRE	-.465* (.236)	.197 (.598)	Italian extra-regional university	.286 (.263)
HOSPITAL	-.028 (.927)	-.038 (.900)	Foreign university	.208 (.239)
FIRMS	-.563* (.255)	.925 (.079)	Regional research centre	-.757 (.387)
REGIONAL INSTITUTIONS	-.629* (.062)		Italian extra-regional research centre	1.12 (.068)
ITALIAN EXTRA-REGIONAL	-.123* (.209)		Foreign research centre	.158 (.736)
FOREIGN	.105* (.257)		Regional hospital	-.275 (.200)
MIXINST	.752* (.116)	.328 (.445)	Italian extra-regional hospital	-.061 (.424)
MIXGEO	.355* (.372)	.158 (.648)	Foreign hospital	.376 (.129)
			Regional firms	.810 (.175)
			Italian extra-regional firms	-.602 (.509)
			Foreign firms	-.169 (.591)
FIRM DUMMIES	No	yes		Yes
YEAR DUMMIES	No	Yes		Yes
Nber of obs.	128	128		128
Pseudo R²	.0462	.0873		.0980
Alpha	1.874°	1.355°°		1.270

The estimations of the determinants of the impact of research (papers' citations) show that the characteristics of the research network is a key determinant

Therefore, it is likely that firms publish papers essentially to build a reputation in the scientific community (making it easier to build future relationships with good university researchers) and to make the university researchers with whom they are collaborating happy (since scientific publication is key for university researchers' career prospects)

The Mirandola firms seem therefore to be creating relationships with universities

And with other institutions (hospitals, other research centres, and other firms)

Not only in the region but also in the rest of Italy and ABROAD: the importance of global pipelines for the success of regional innovation systems is confirmed here

However, collaboration with universities and research centres mainly regards largest firms

However...Earthquakes in May 2012



Many plants are destroyed



90% of the firms in the cluster are affected by the earthquake...

However, reconstruction and re-start of plants is very rapid: already in September 2012 many firms start production again.

Fear that multinationals would go away from the cluster after the earthquake:

In fact NO, MULTINATIONALS STAY,
thanks to distinctive competencies of the
cluster's firms and regional programmes
aimed at supporting firms in the cluster
(financial support conditioned on the fact
that firms would remain in the cluster)

**⇒ Importance of industrial policies,
especially at regional level**