

AUGUR – Challenges for Europe in the world in 2030

Brussels 17/18 2011

Trade and Technology (WP 3)

Michael A Landesmann

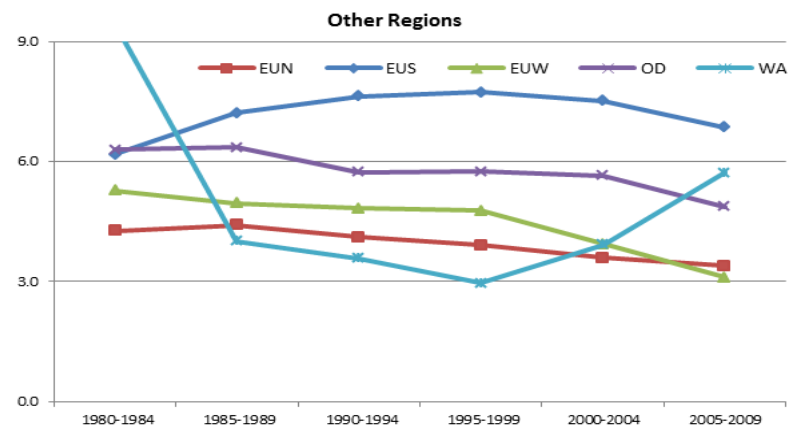
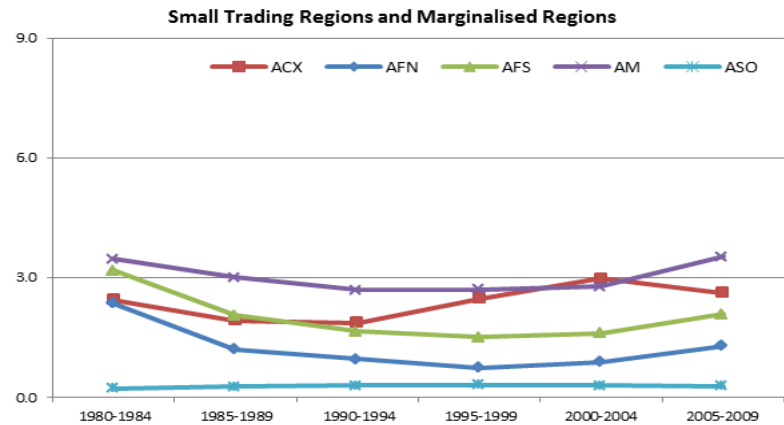
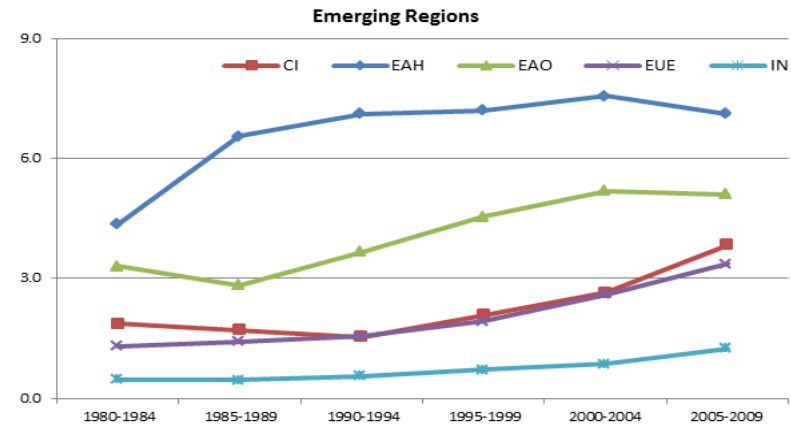
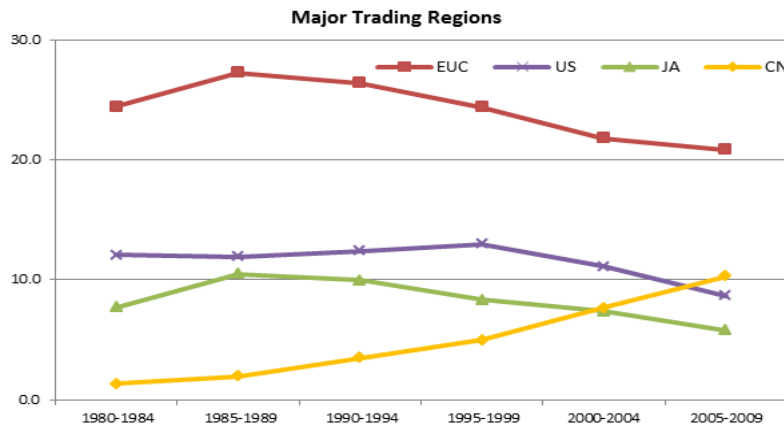
WP3: Trends in trade and technology (innovation/ technology transfer) and scenario analysis – Working Papers

- R. Stoellinger:
 - Trade specialisation and global/regional trade integration – goods trade
 - Club convergence, threshold effects in innovation and technology transfer
- O. Pindyuk:
 - Trade specialisation and global/regional trade integration – services trade
- G. Hunya:
 - Global business organisation and patterns of FDI
- N. Foster:
 - Innovation and technology transfer – use of R&D and patent statistics
 - The role/impact of intellectual property rights (IPR)
- C.P. Chandrasekhar and J. Ghosh:
 - Upheaval in the World Economy: China and India as a Challenge to Europe (contribution from the Emerging Economies Consortium)
- M. Landesmann: Compilation of inputs from WP3 for AUGUR scenario analysis.

WP3: Trends in trade and technology – Review of research results

- Trends in trade integration and trade specialisation:
 - Global vs. regional trade integration – goods trade, services trade
 - Convergence processes and trends in trade specialisation
 - Regional vs. global trade and production integration
- International business organisation and patterns of FDI
 - Again: regional vs. global
 - Incumbents and businesses from EMEs
- Patterns of innovation and technology transfer
 - Innovation activity
 - Technology transfer
 - Internationalisation of research and development
 - The role of IPR

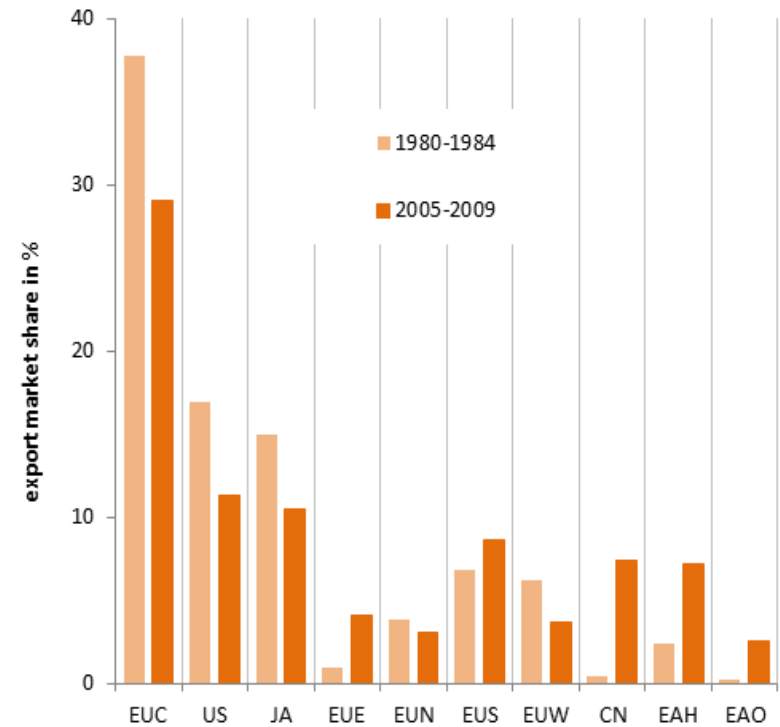
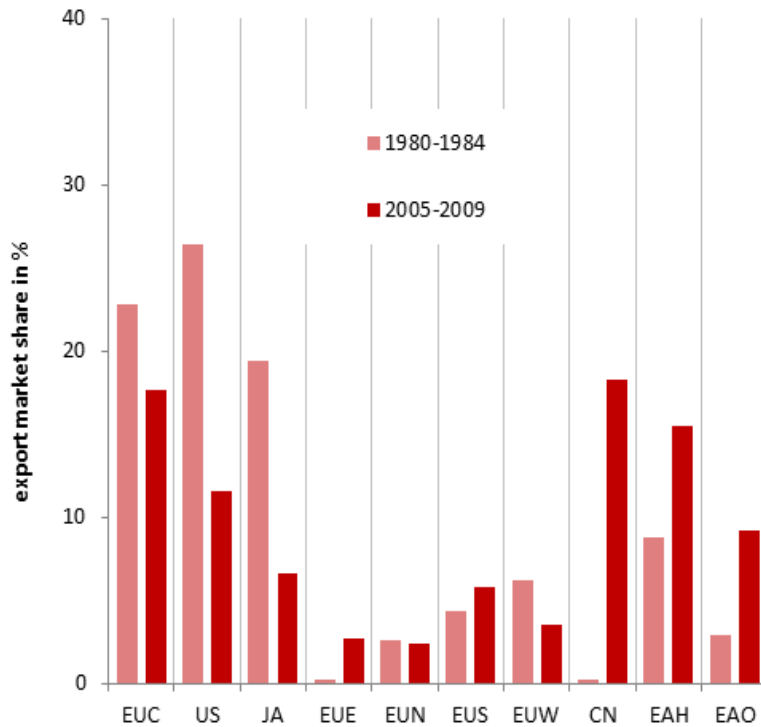
Global export market shares by region, 1980-2009 (total trade)



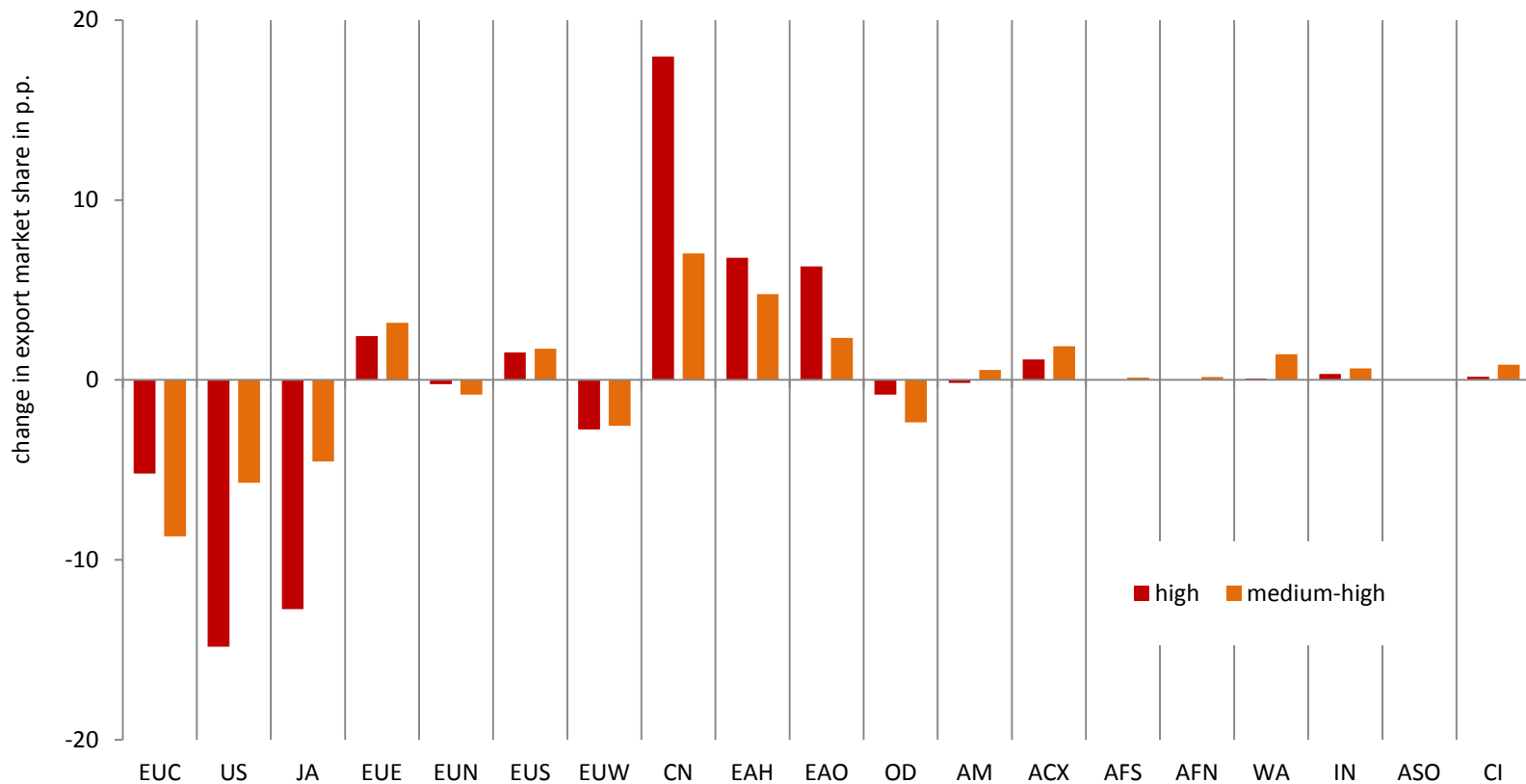
Export market shares of high tech & medium-high tech industries (in %), selected regions, 1980-1985 vs. 2005-2009

High-tech

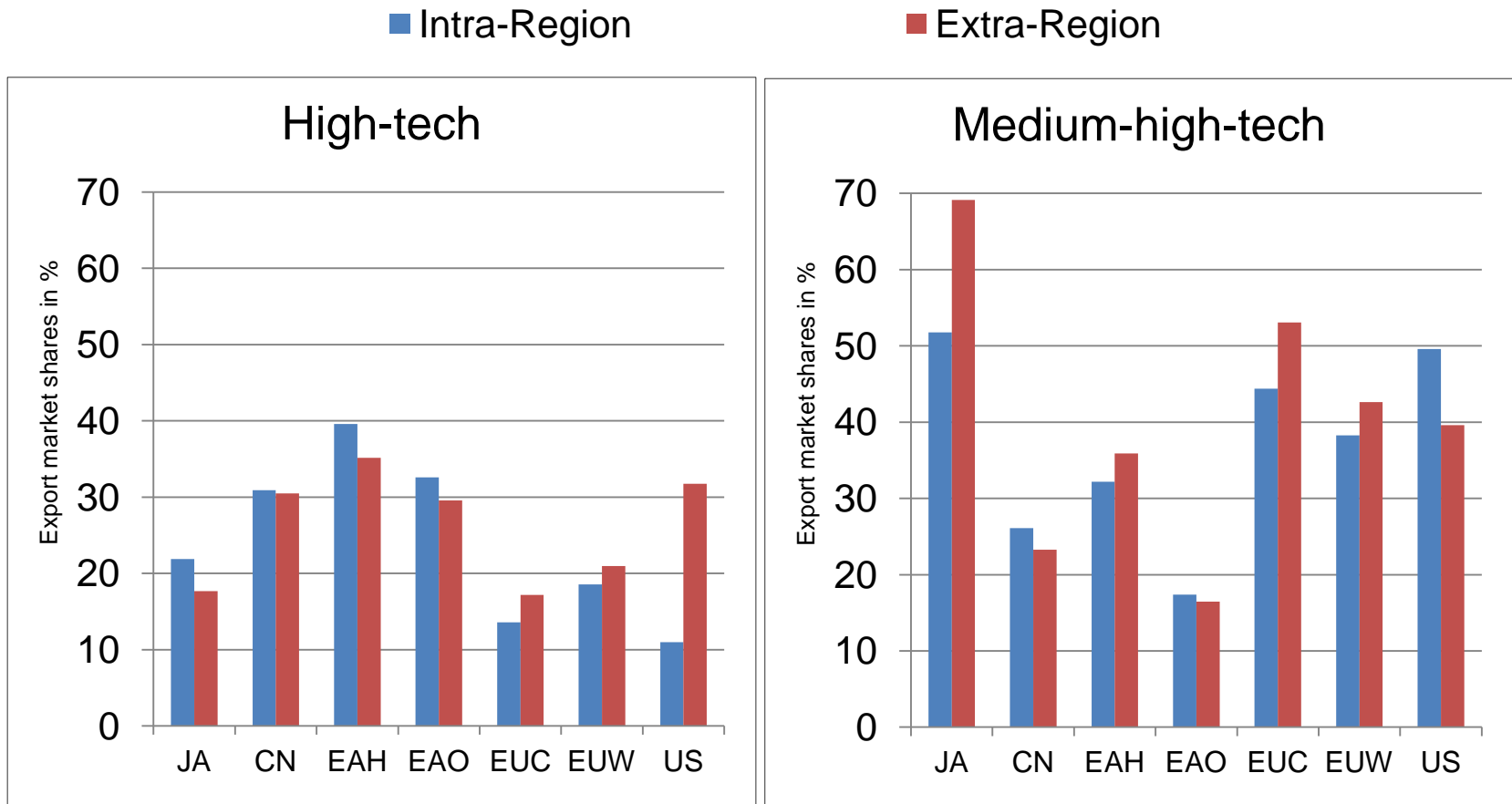
Medium-high tech



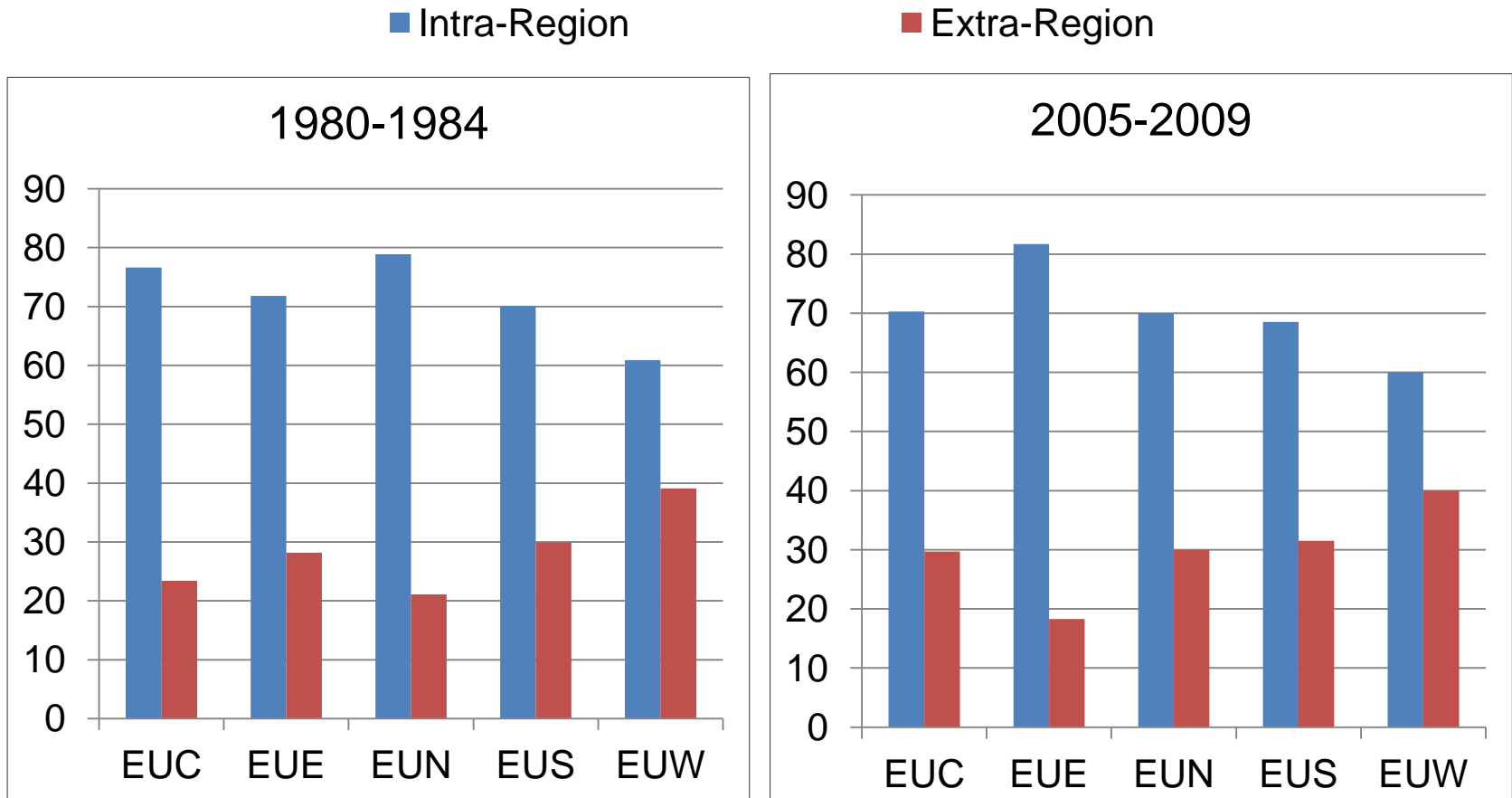
Changes in export market shares of high tech & medium-high tech industries in p.p., 1980-1985 vs. 2005-2009, all regions



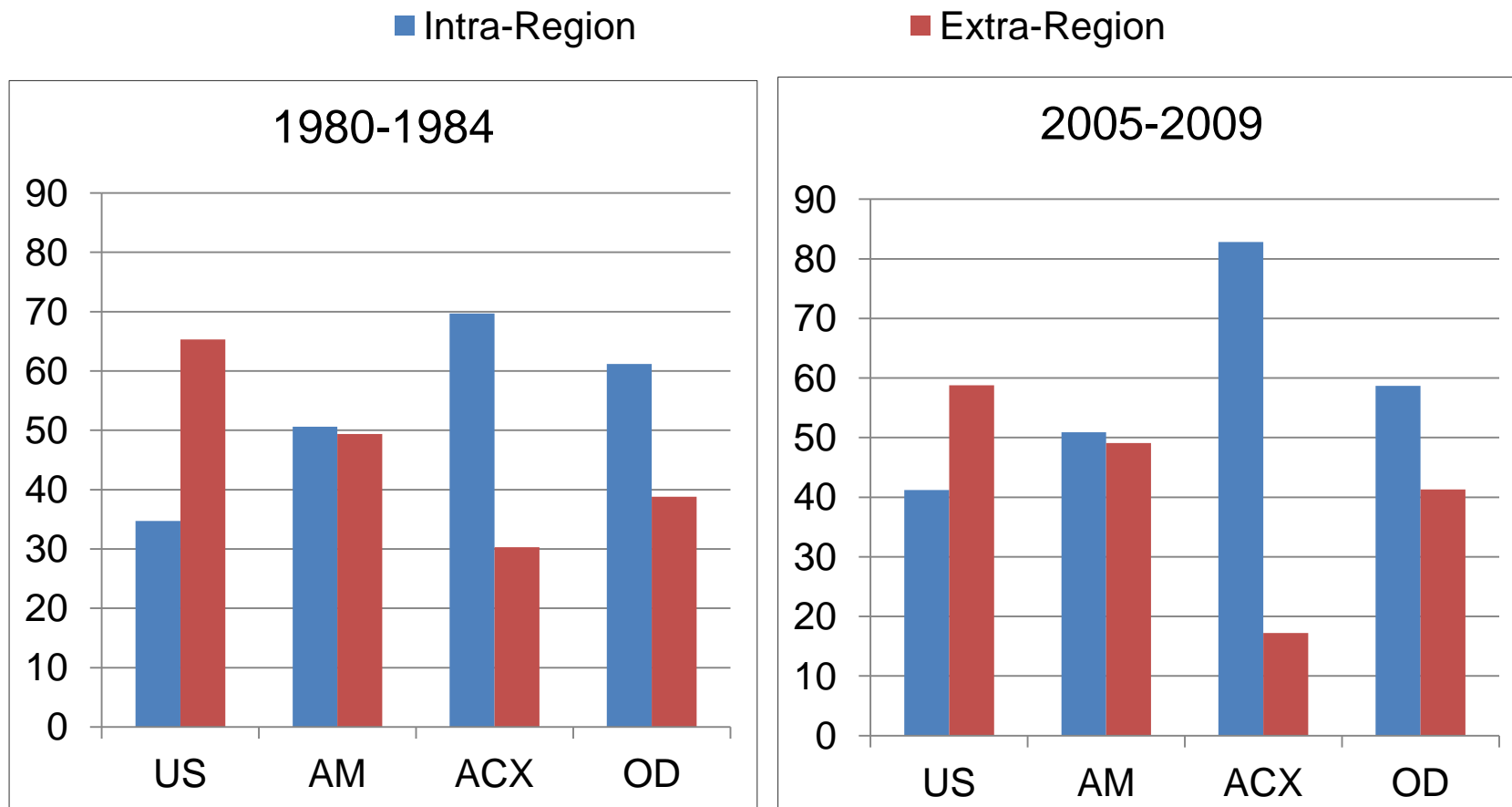
Export structures: shares of high tech & medium-high tech industries in total goods exports: intra- and extra regional



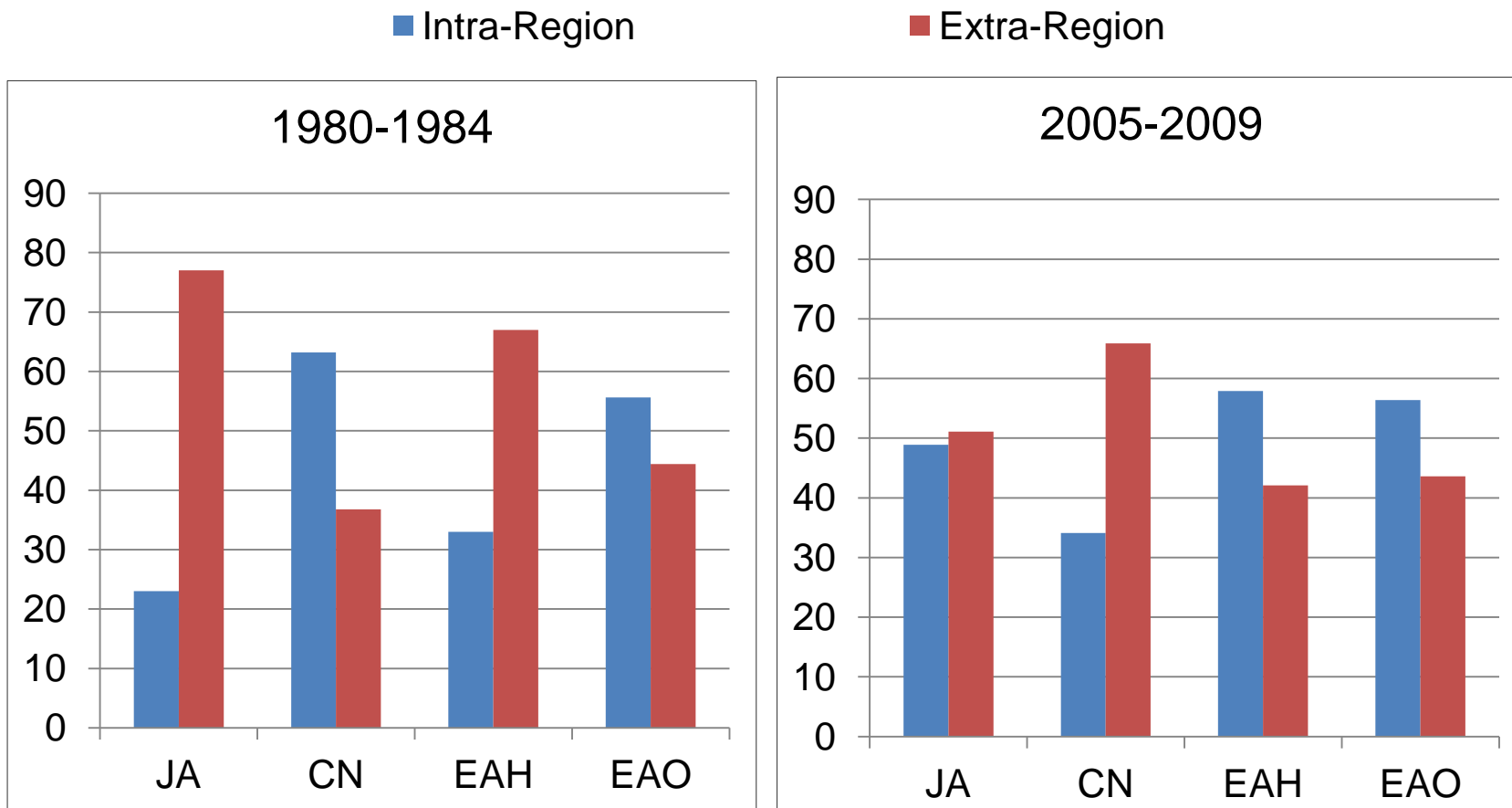
Regional export market shares (goods trade), 1980-1984 and 2005-2009 in Europe



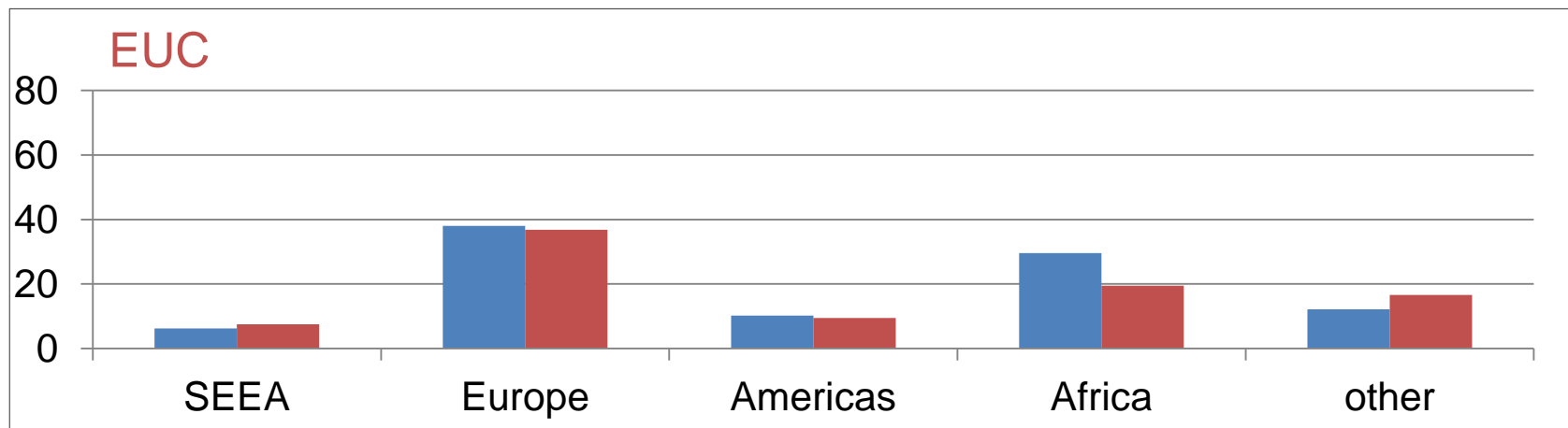
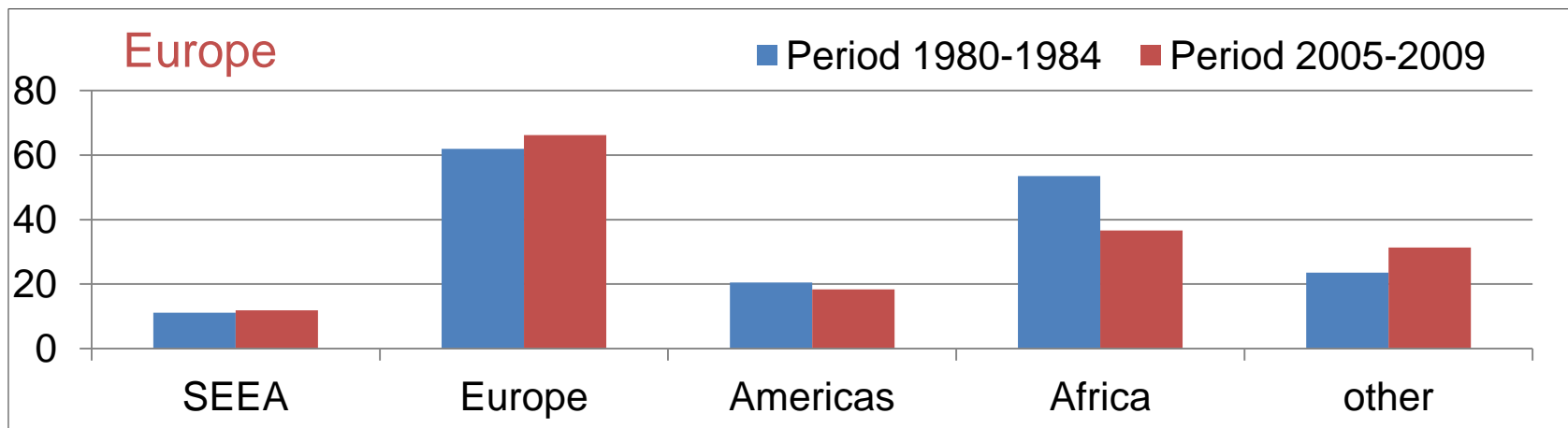
Regional export market shares (goods trade), 1980-1984 and 2005-2009 in **Amer.& Europ. Offsprings**



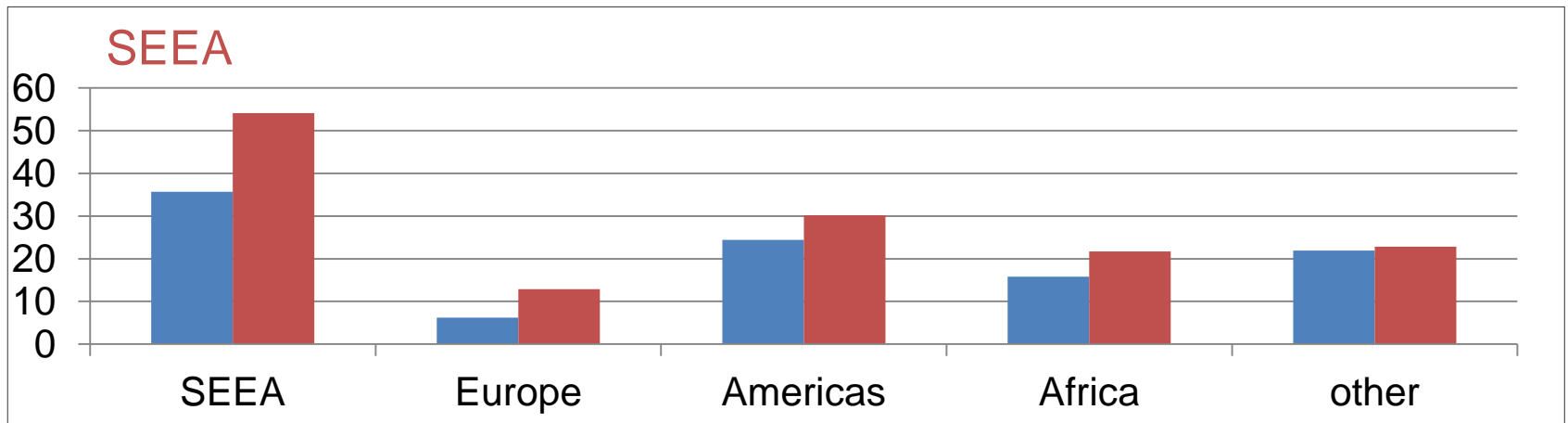
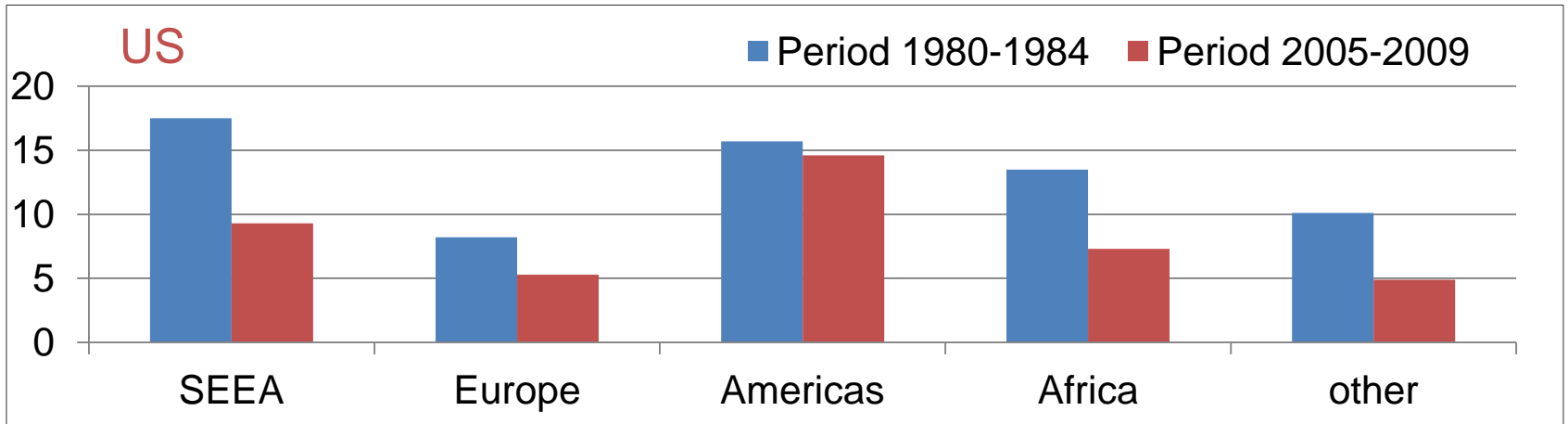
Regional export market shares (goods trade), 1980-1984 and 2005-2009 in **SEEA**



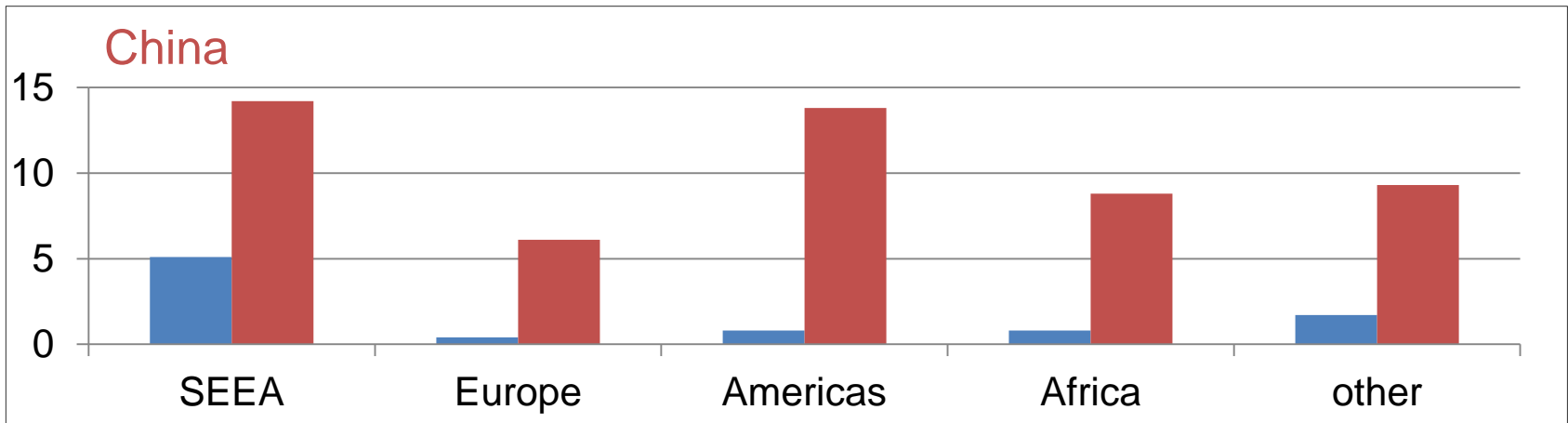
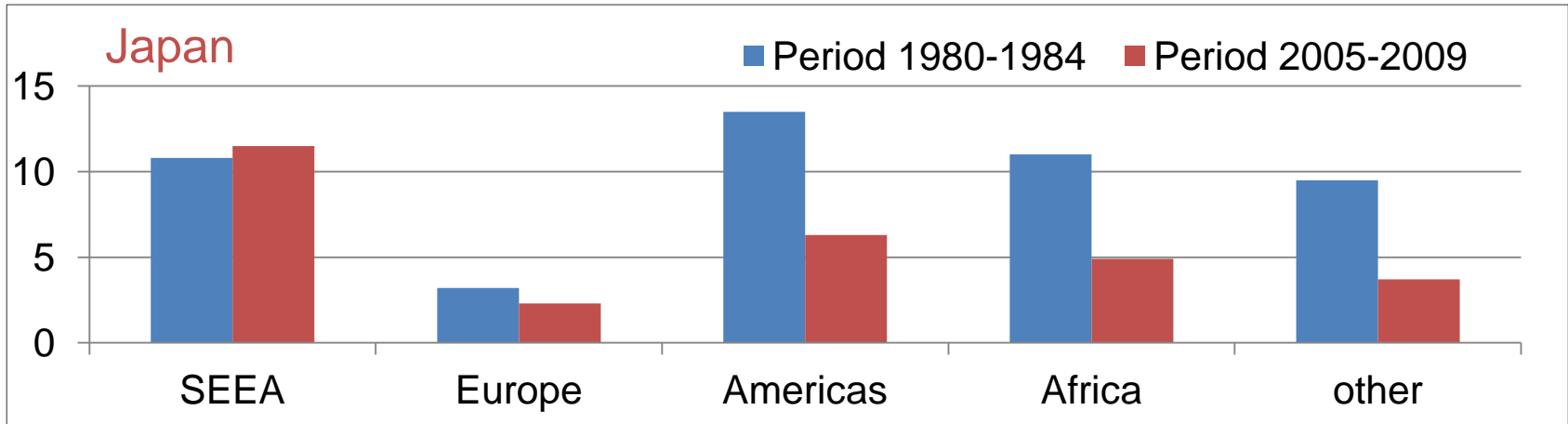
Market shares in regional export markets (%), 1980-1984 and 2005-2009 (goods trade)



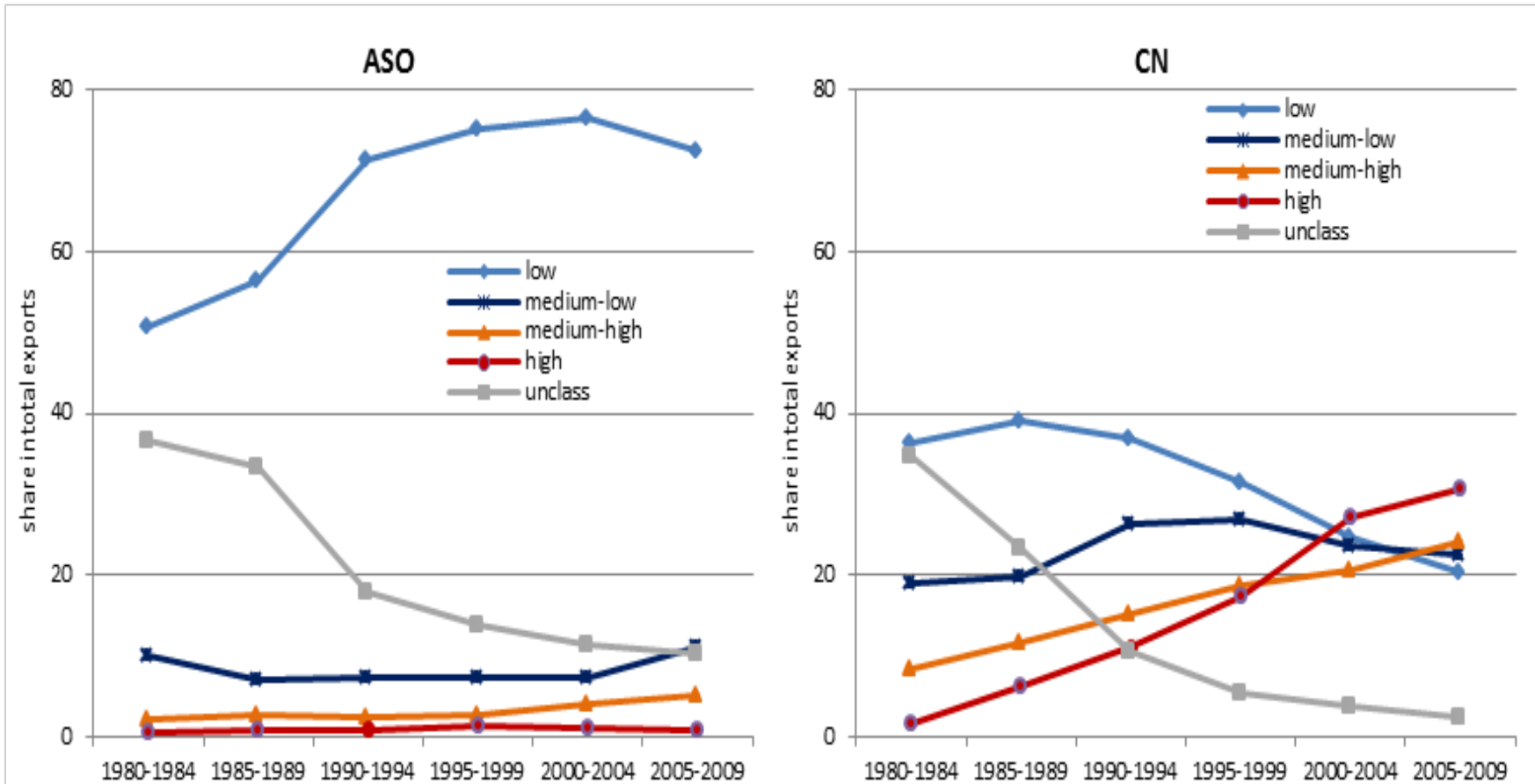
Market shares in regional export markets (%), 1980-1984 and 2005-2009 (goods trade)



Market shares in regional export markets (%), 1980-1984 and 2005-2009 (goods trade)

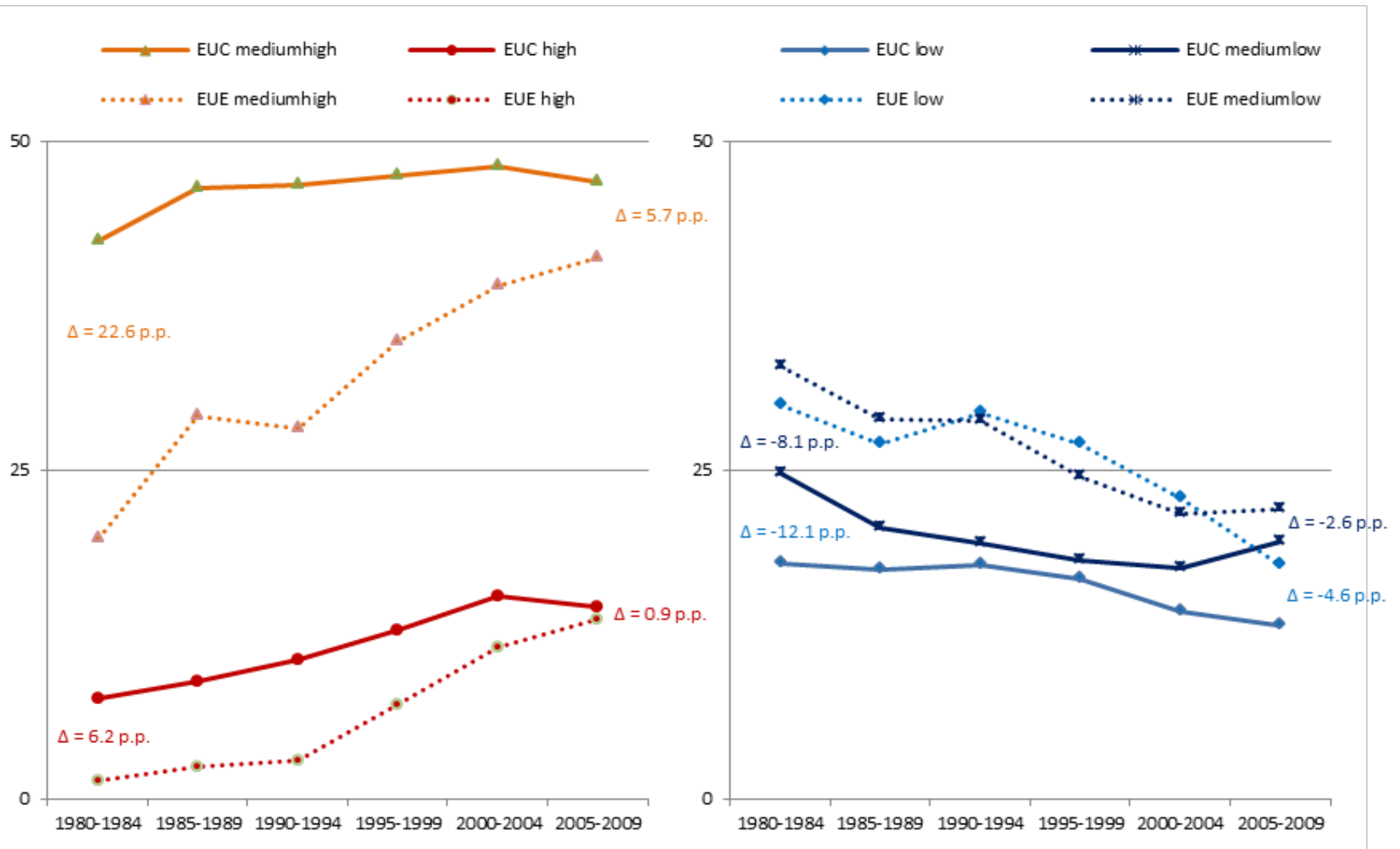


Dynamics of specialisation – shares of tech classes in goods exports - South Asia vs. China, 1980-2009



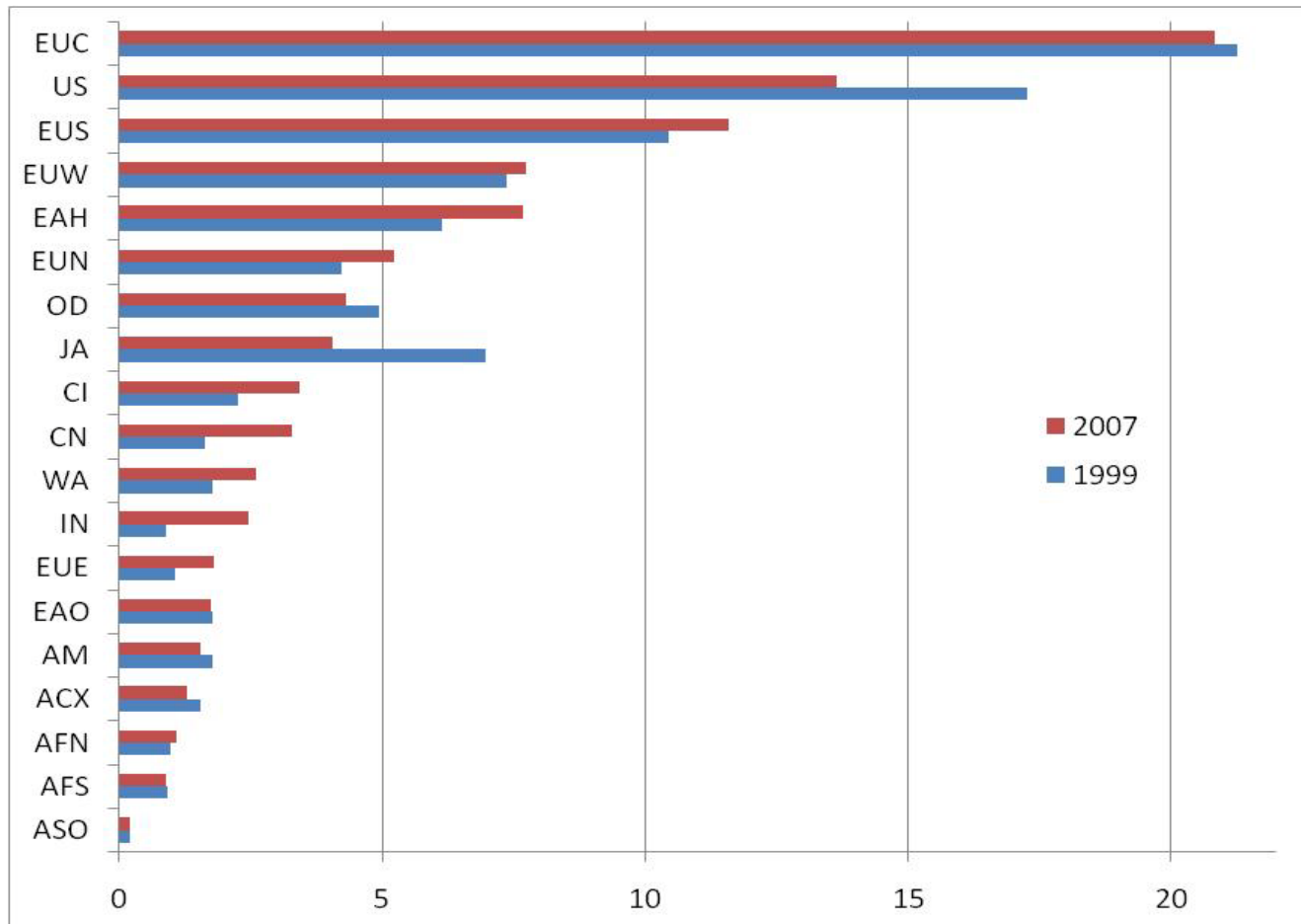
Source: UN Comtrade (WITS download), wiiw-calculations.

Convergence of export structures within Europe

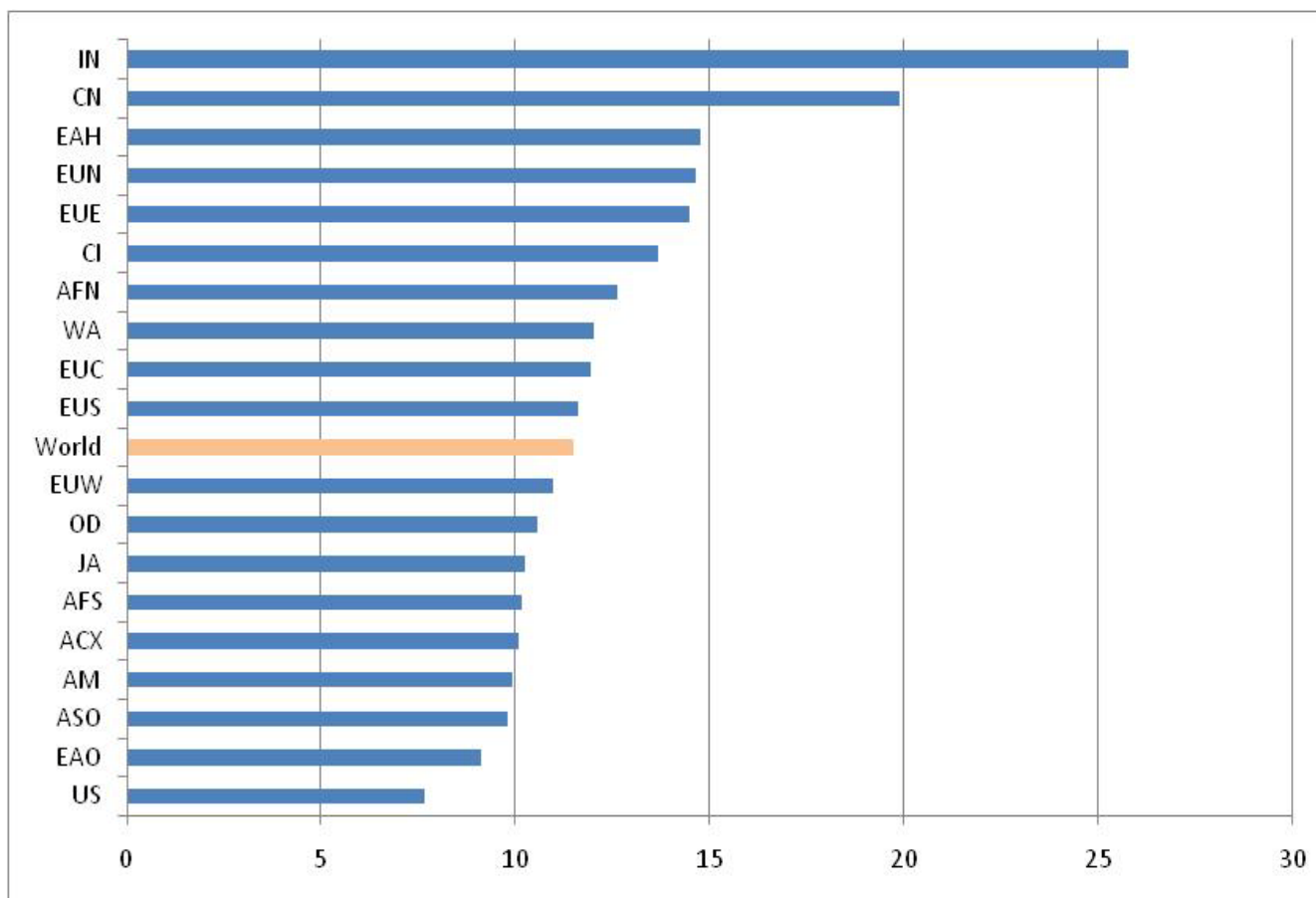


Source: UN Comtrade (WITS download), wiiw-calculations.

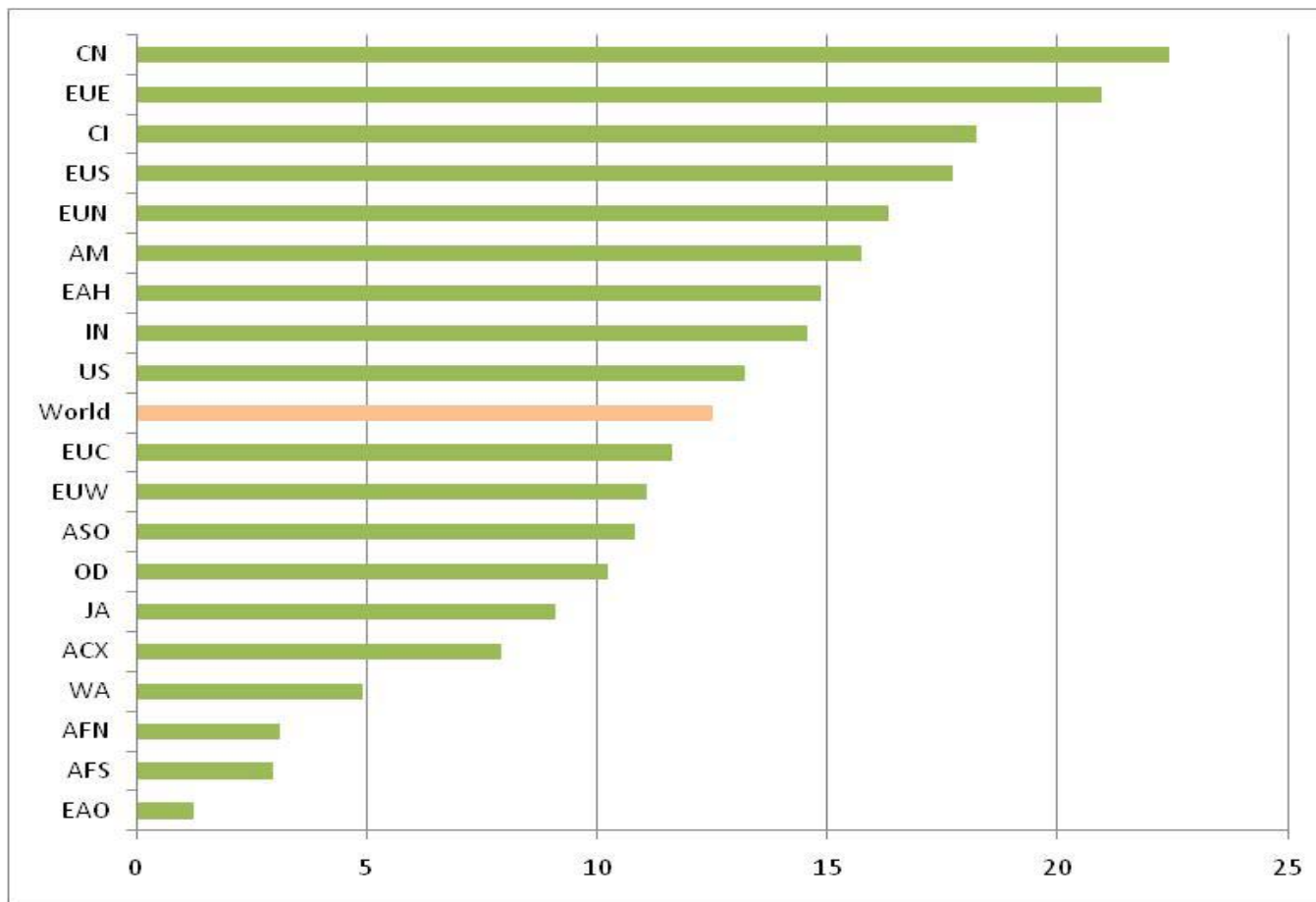
Services exports (in global, %) by AUGUR regions



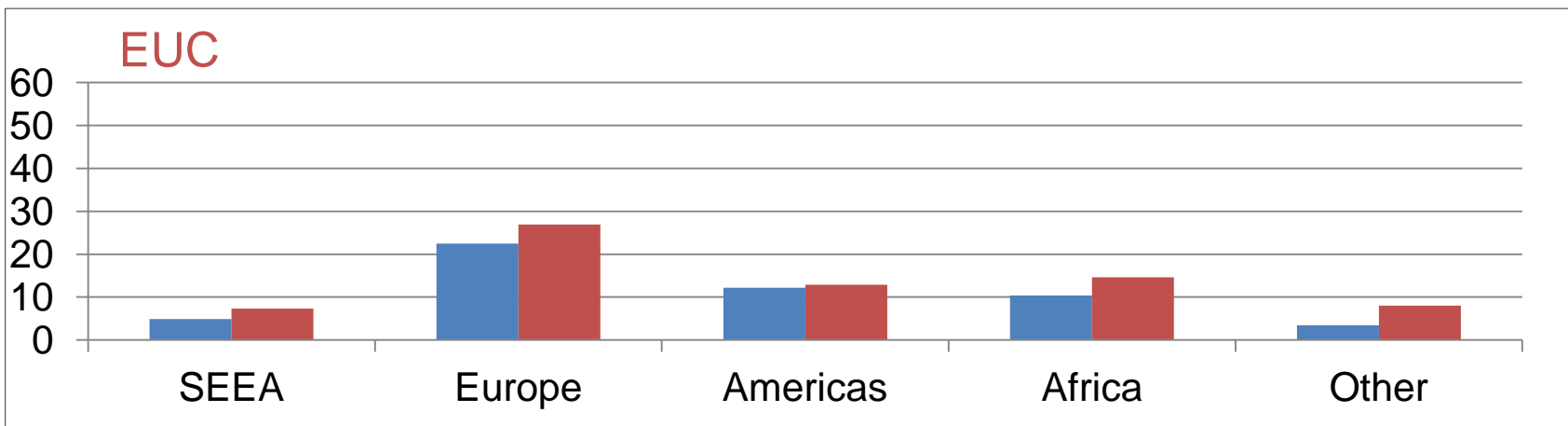
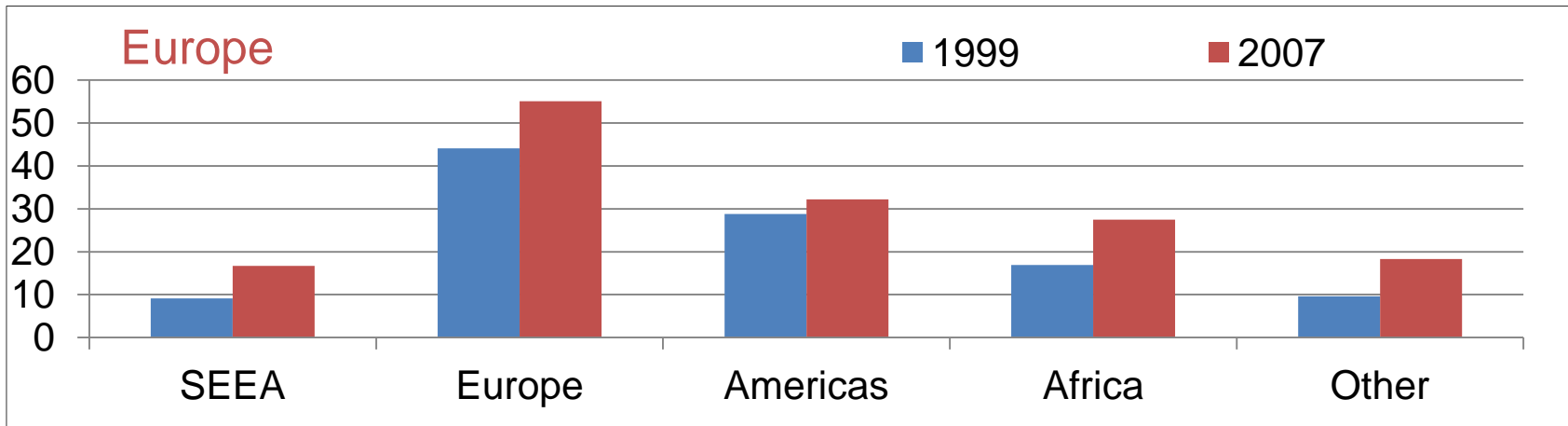
Average growth of services exports in 1999-2007



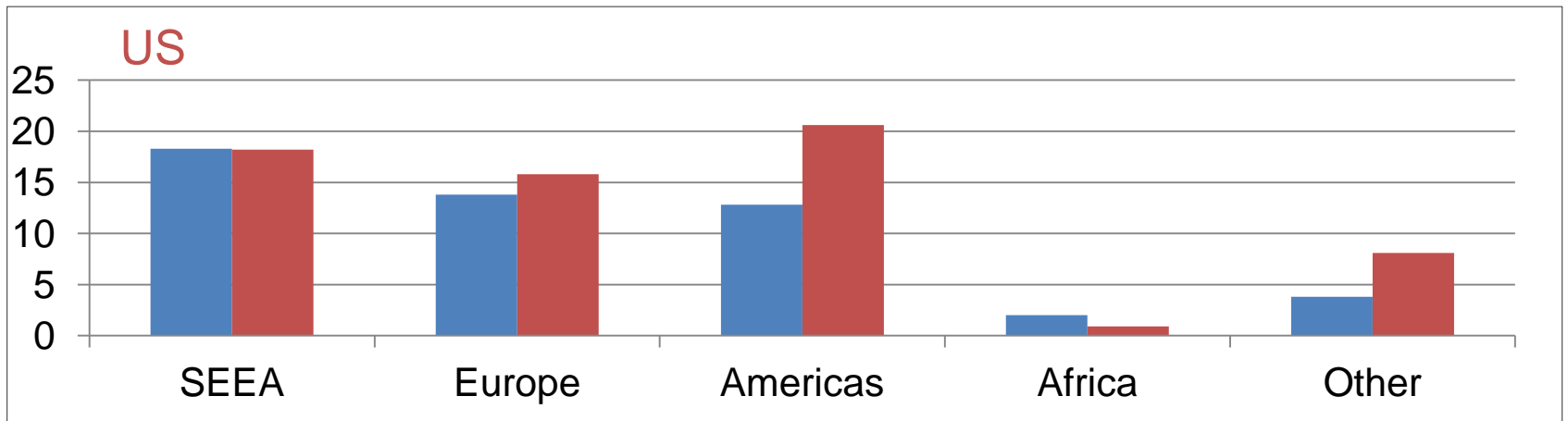
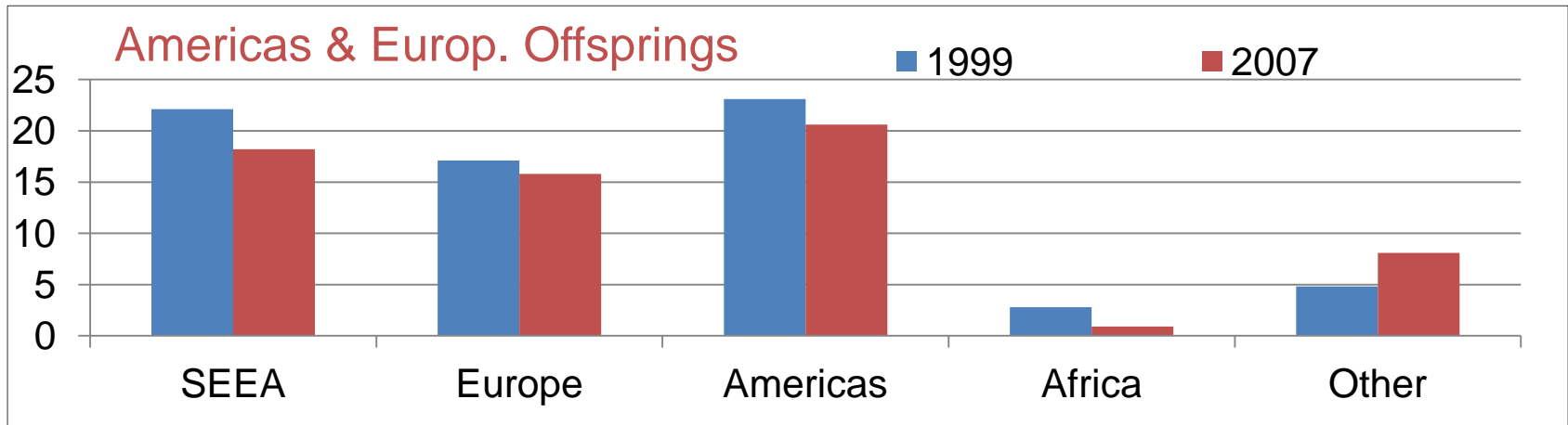
Average growth of other business services exports during 1999-2007, %



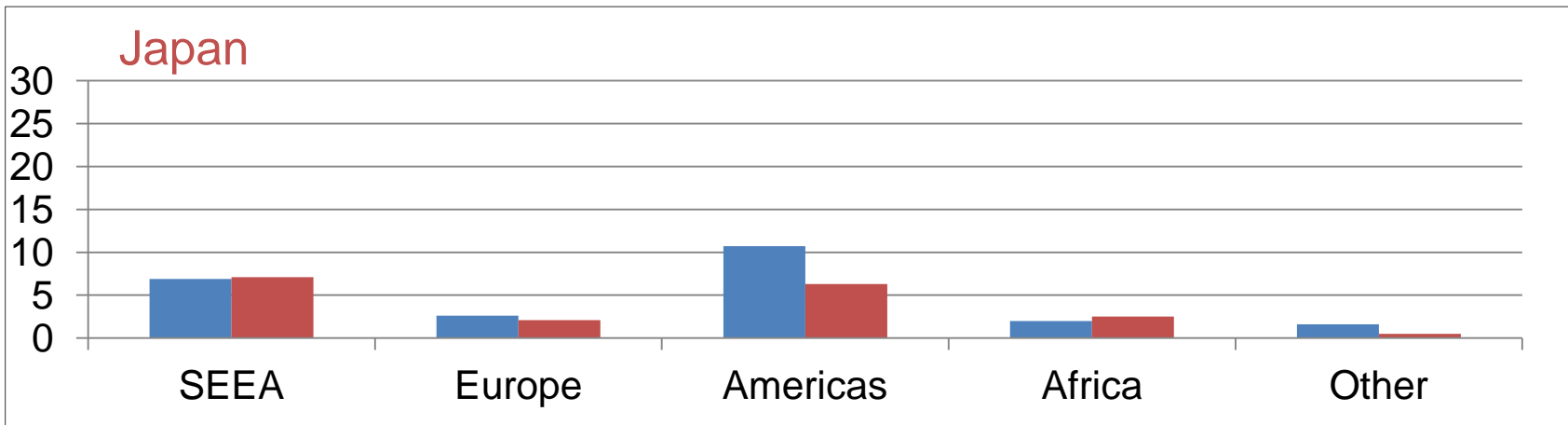
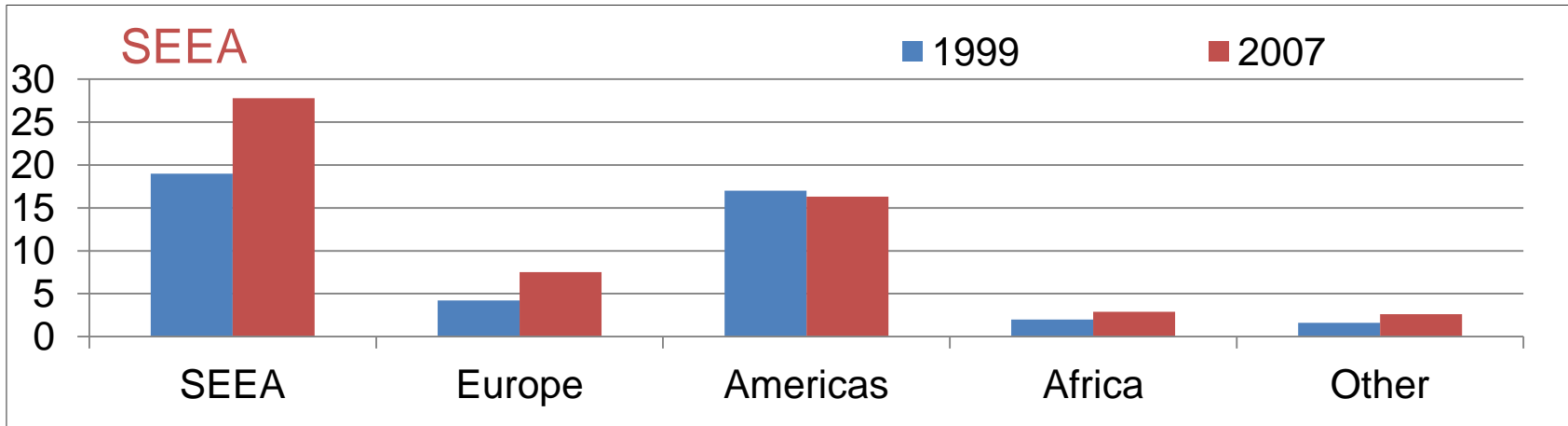
Services exports, global market shares – Regional orientation, 1999 and 2007



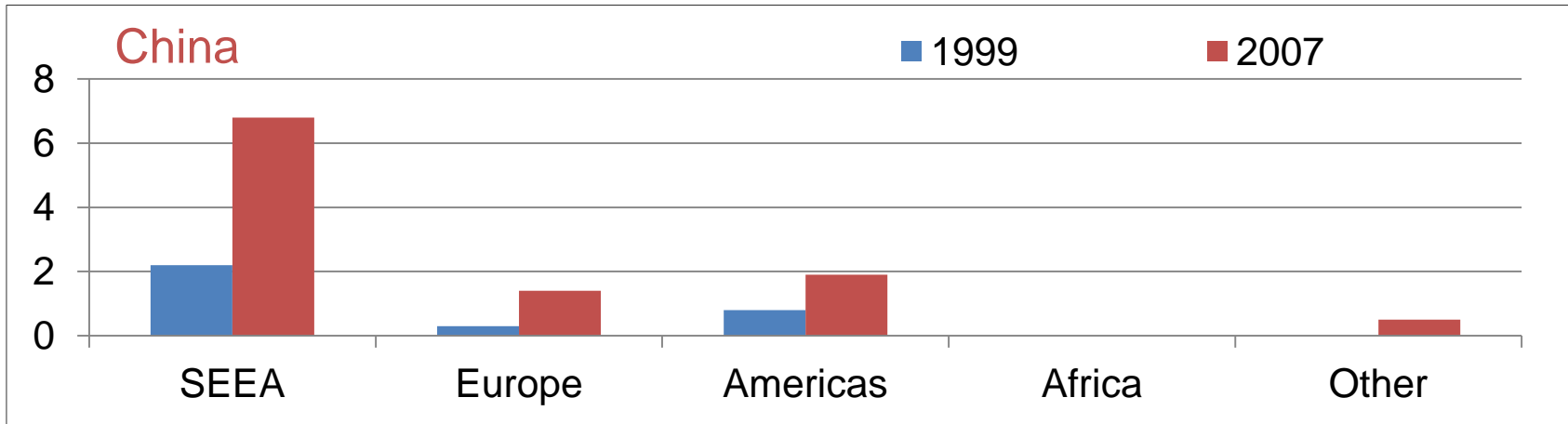
Services exports, global market shares – Regional orientation, 1999 and 2007



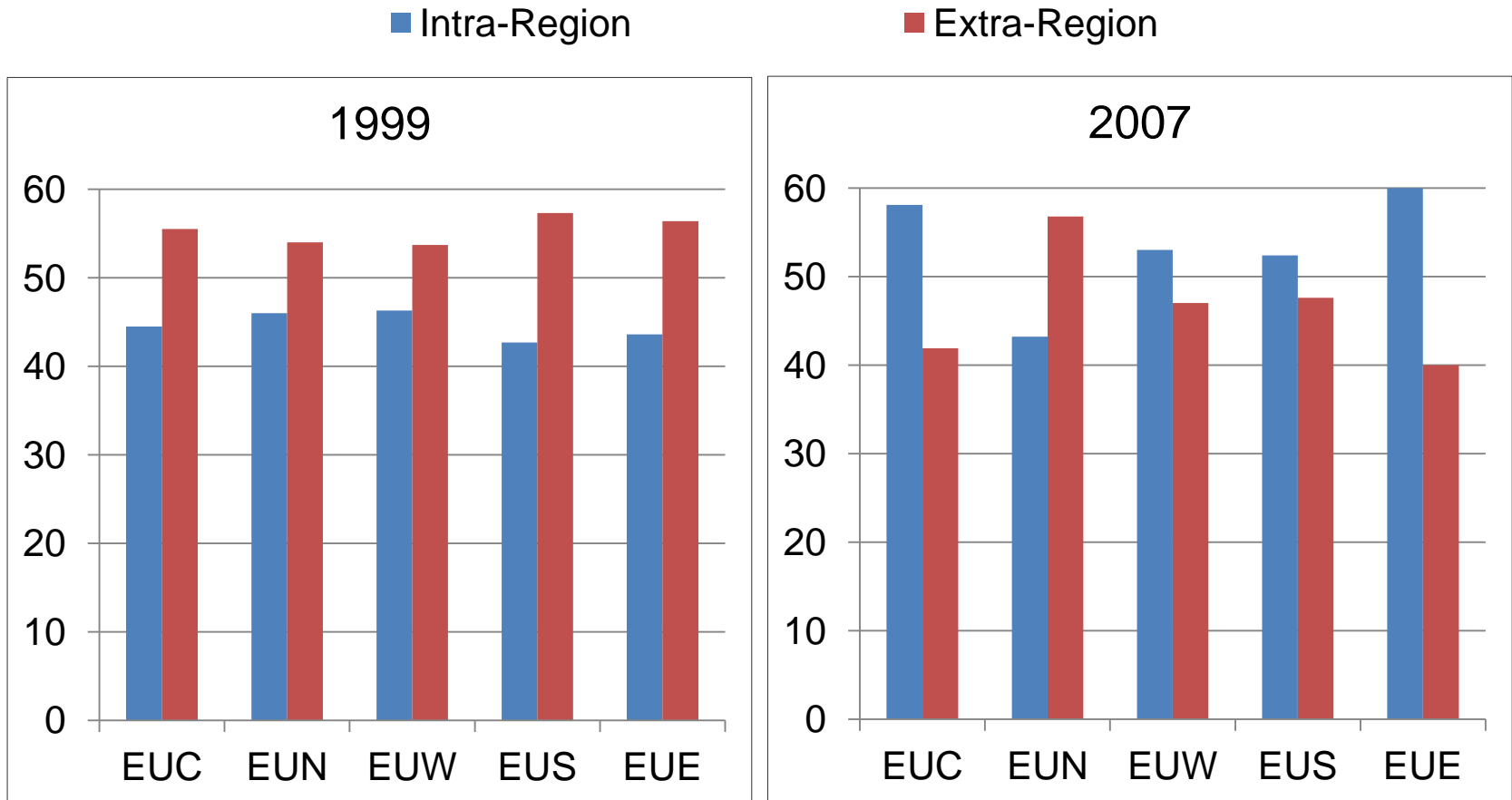
Services exports, global market shares – Regional orientation, 1999 and 2007



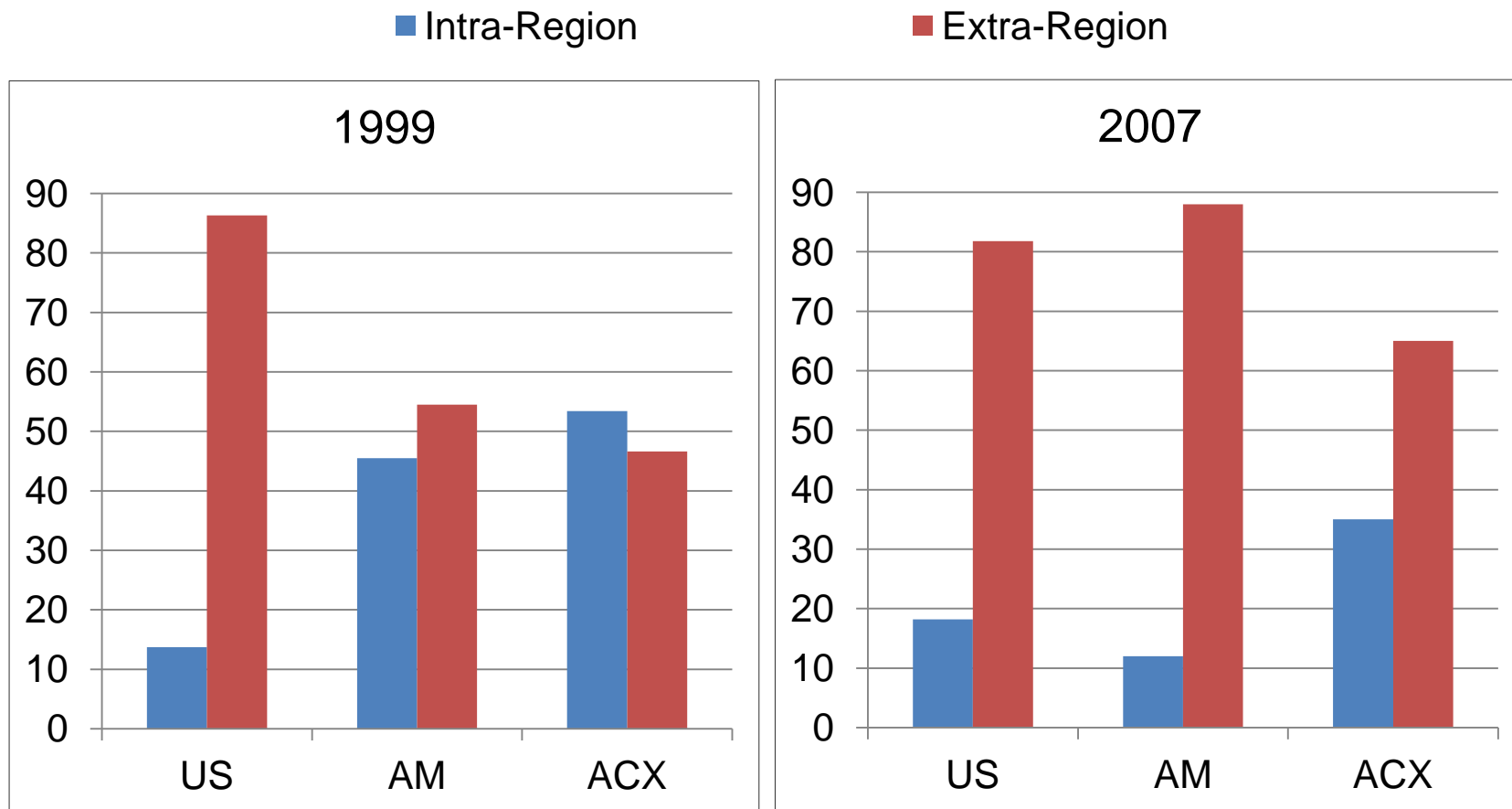
Services exports, global market shares – Regional orientation, 1999 and 2007



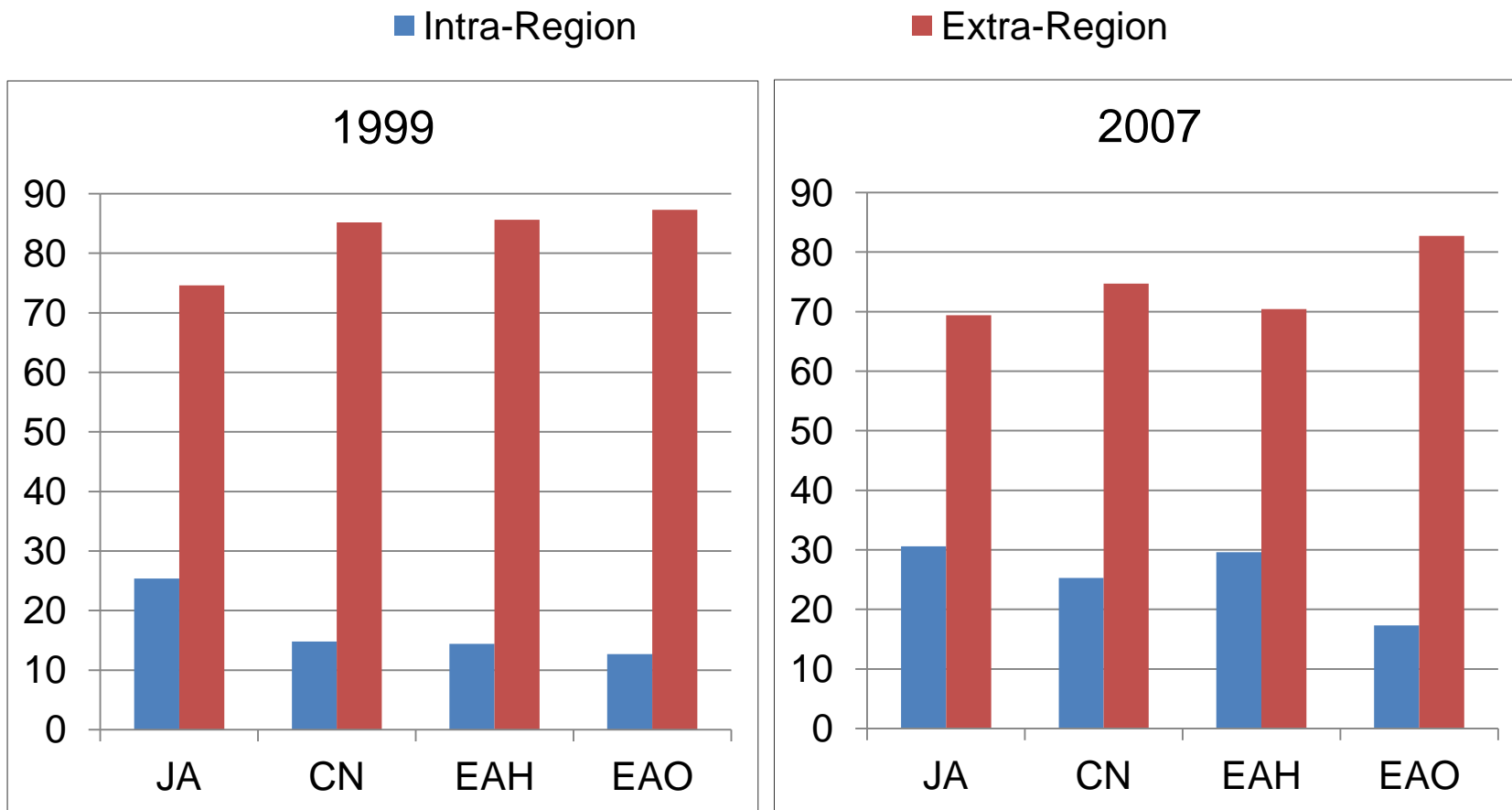
Geographical structure of services exports by regions, 1999 and 2007 in Europe



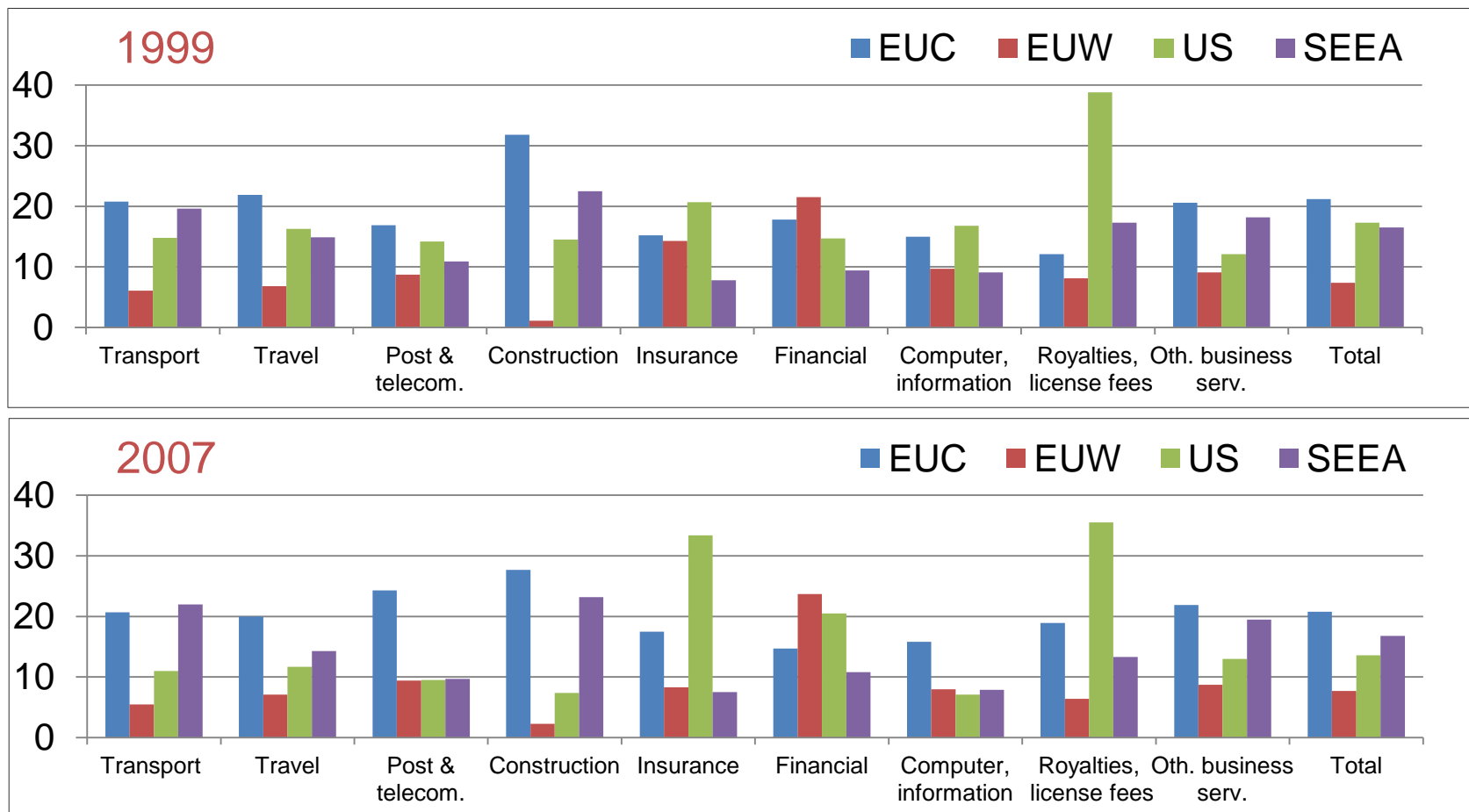
Geographical structure of services exports by regions, 1999 and 2007 in **Americas & Europ. Offsprings**



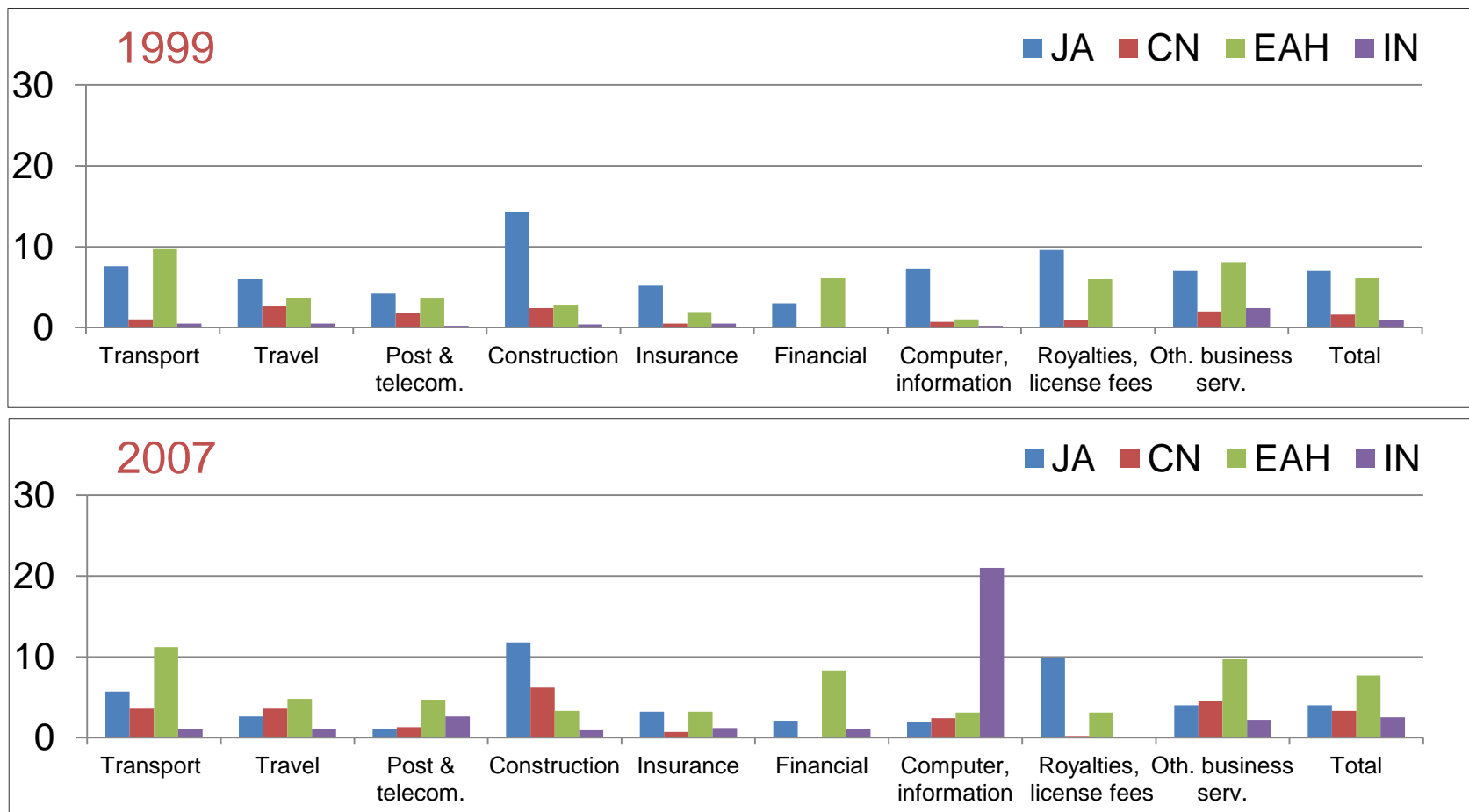
Geographical structure of services exports by regions, 1999 and 2007 in **SEEA**



Share of regions in global services exports by sectors, 1999 and 2007, EUC, EUW, US, SEEA

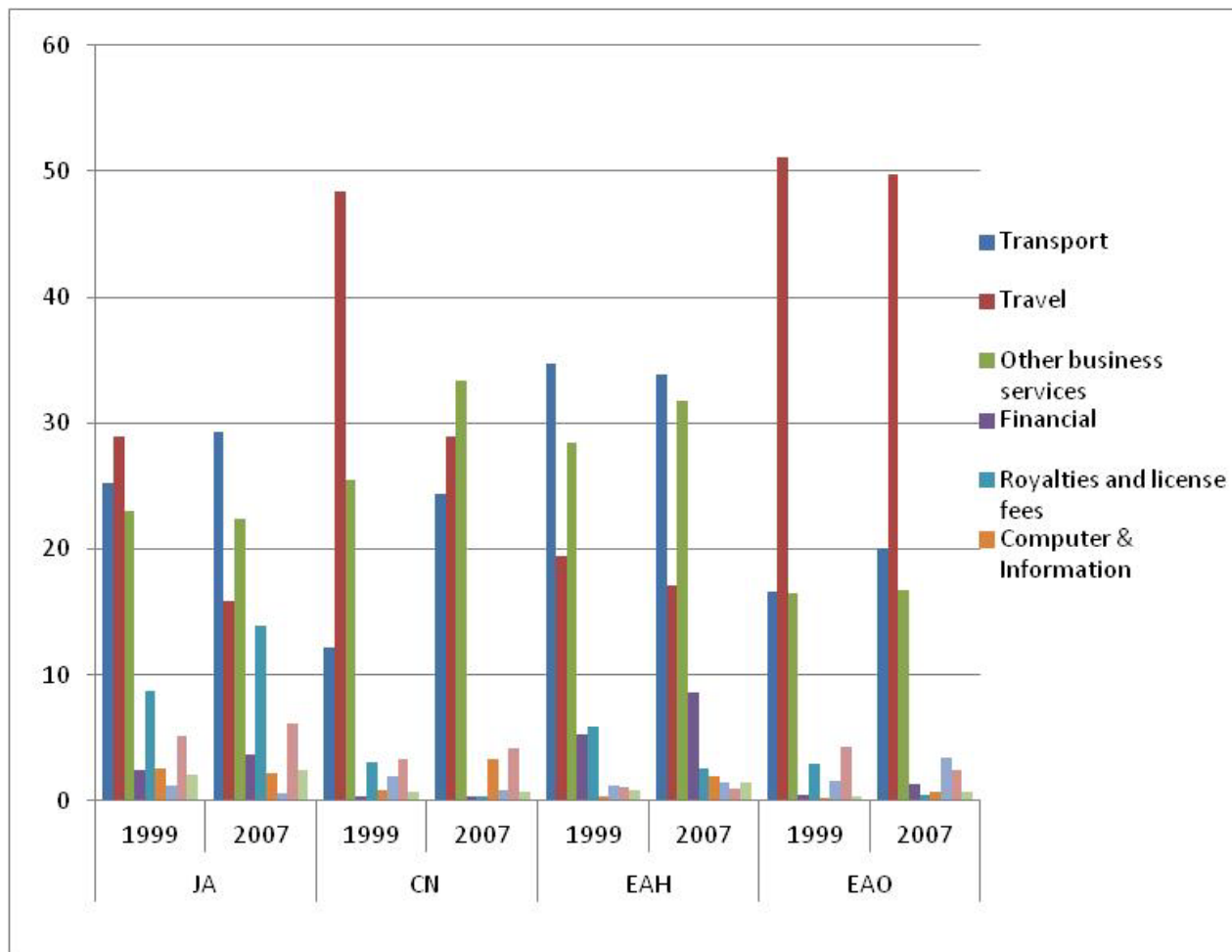


Share of regions in global services exports by sectors, 1999 and 2007, **SEEA region**



Source: TSD.

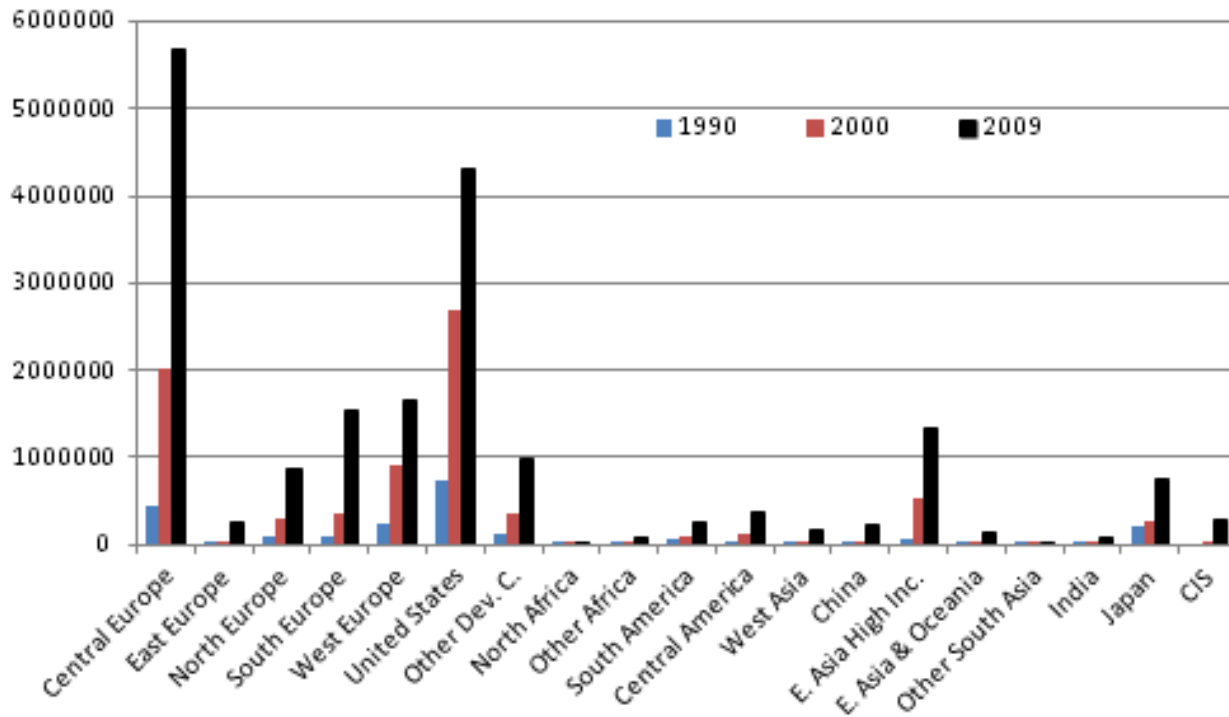
Commodity structure of Asian services exports



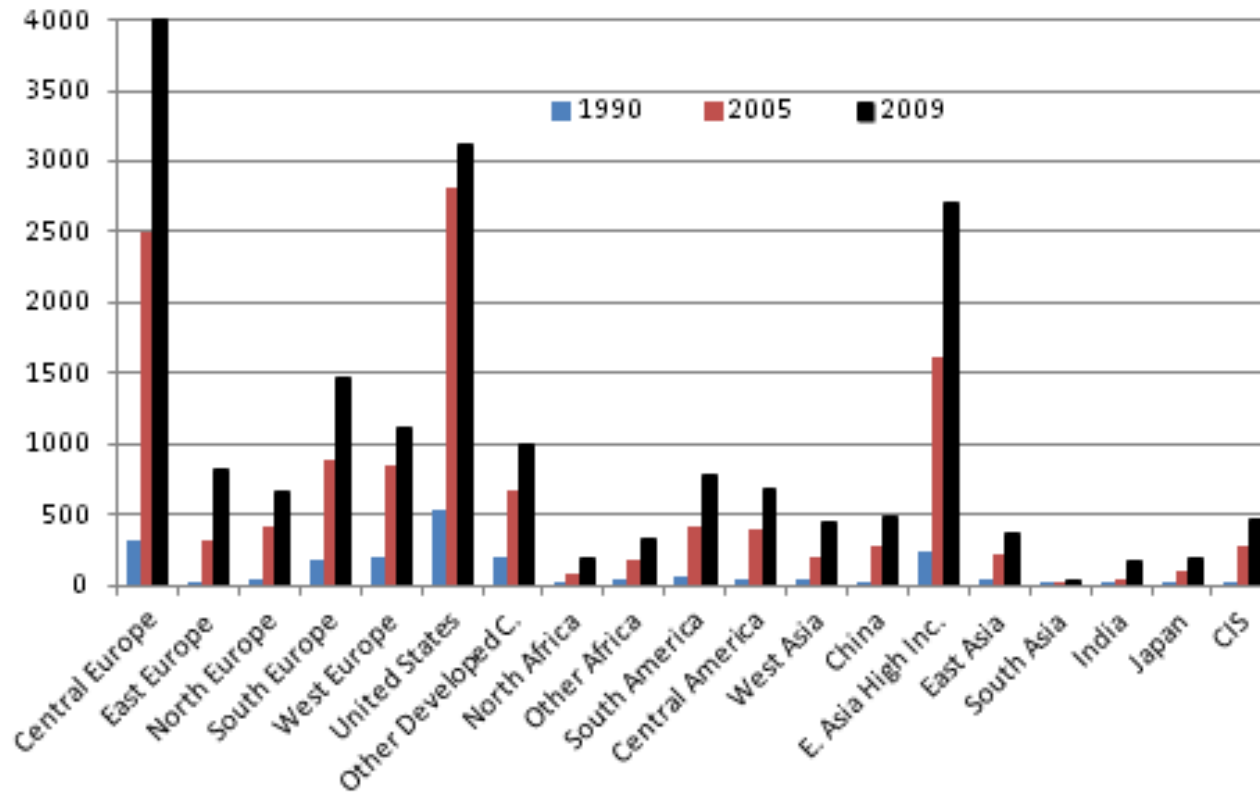
Summary on trade specialisation and regional vs. global trade integration

- Changing patterns of trade specialisation:
 - Rapid growth of select group of EMEs and link to catching-up
 - Club convergence: non-linearities/thresholds and absorption capabilities
 - Is Lisbon Agenda failing in European trade specialisation?
 - Goods vs. services specialisation
- Regional vs. global trade integration
 - Strong bias towards regional integration in Europe and increasingly in Asia
 - What will remain of globalisation and international production networks?
 - What are the implications for trade policy and the WTO?
- Patterns of trade specialisation closely linked with convergence patterns and regional/global production integration

FDI outward stock of Augur Blocks, 1990, 2000, 2009, USD million



FDI inward stock of Augur Blocks, 1990, 2000, 2009, USD million

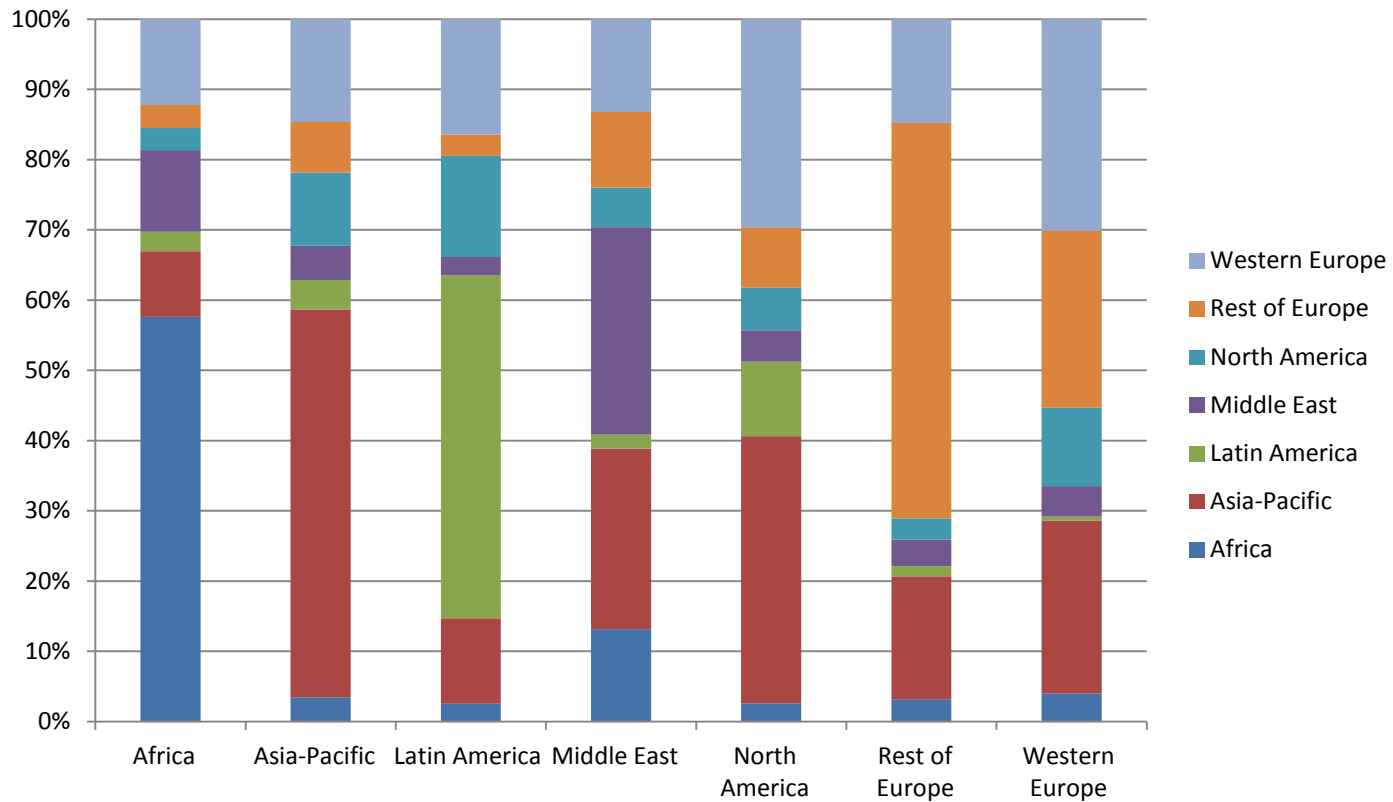


Outward and inward FDI stock/GDP of the EU-15 by continents, in %

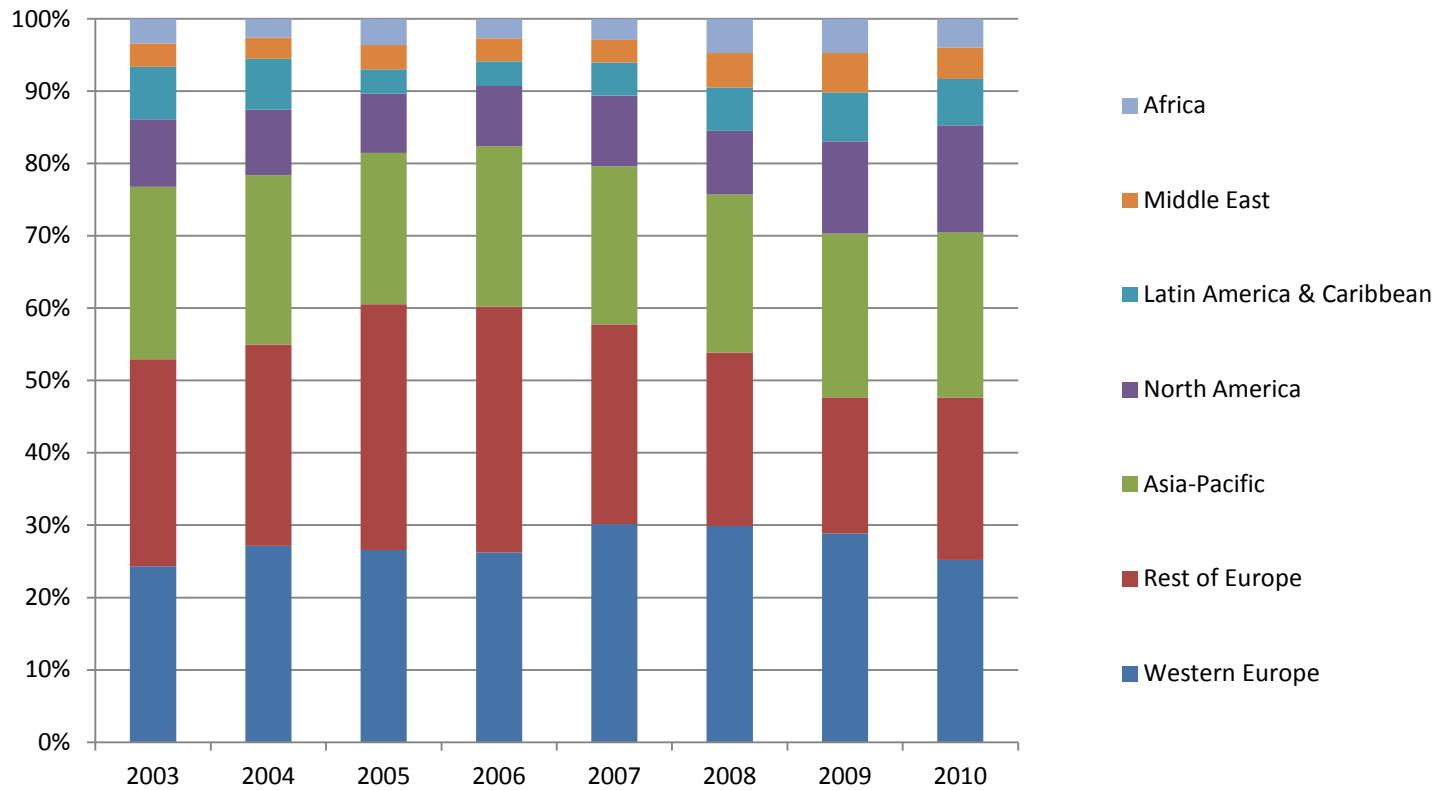
(Total outward 1998: EUR 1668 bn, 2009: 9536 bn; inward 1998: EUR 1467 bn, 2009: 8306 bn)

	Outward		Inward	
	1998	2009	1998	2009
Intra EU-15	49.4	57.3	45.9	66.2
Extra EU-15	50.6	42.7	44.1	33.8
In which North America	26.1	13.5	26.4	14.0
Central America	2.3	4.1	1.8	4.9
South America	4.9	2.5	0.1	0.8
Asia	4.9	5.8	3.7	3.7
CIS	0.2	1.6	0.1	0.5
Other Europe and RoW	12.2	15.2	11.9	9.9

Home (horizontal axis) and host (vertical axis) of green field projects 2003-2010



EU-27 investment project number by destination region and year



Summary on international business organisation and FDI

- Changing patterns of trade specialisation:
 - Rapid growth of select group of EMEs and link to catching-up
 - Club convergence: non-linearities/thresholds and absorption capabilities
 - Is Lisbon Agenda failing in European trade specialisation?
 - Goods vs. services specialisation
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 - Strong bias towards regional integration in Europe and increasingly in Asia
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R&D Spending by AUGUR Region – 1996-2009

(Source: UNESCO)

AUGUR Region	R&D Spending (1,000,000 US\$)	Share in Total R&D	Cumulative Share	Growth Rate of R&D
US	269000	39.09		3.56
JA	152000	22.09	61.18	2.69
EUC	101000	14.68	75.86	3.06
OD	28900	4.20	80.06	5.42
EUW	27700	4.03	84.08	2.24
EUS	22500	3.27	87.35	7.71
EUN	21100	3.07	90.42	3.68
EAH	19300	2.80	93.23	9.04
CN	17900	2.60	95.83	15.90
AM	9180	1.33	97.16	5.76
IN	3900	0.57	97.73	8.08
CI	3440	0.50	98.23	6.12
WA	2790	0.41	98.63	5.70
EUE	2740	0.40	99.03	14.17
ACX	2580	0.37	99.41	11.92
AFS	1800	0.26	99.67	-0.57
EAO	1150	0.17	99.83	-6.14
AFN	855	0.12	99.96	-1.14
ASO	284	0.04	100.00	9.98

Average Number of Domestic Patent Applications by AUGUR Region (1960-2009)

(Source: WIPO)

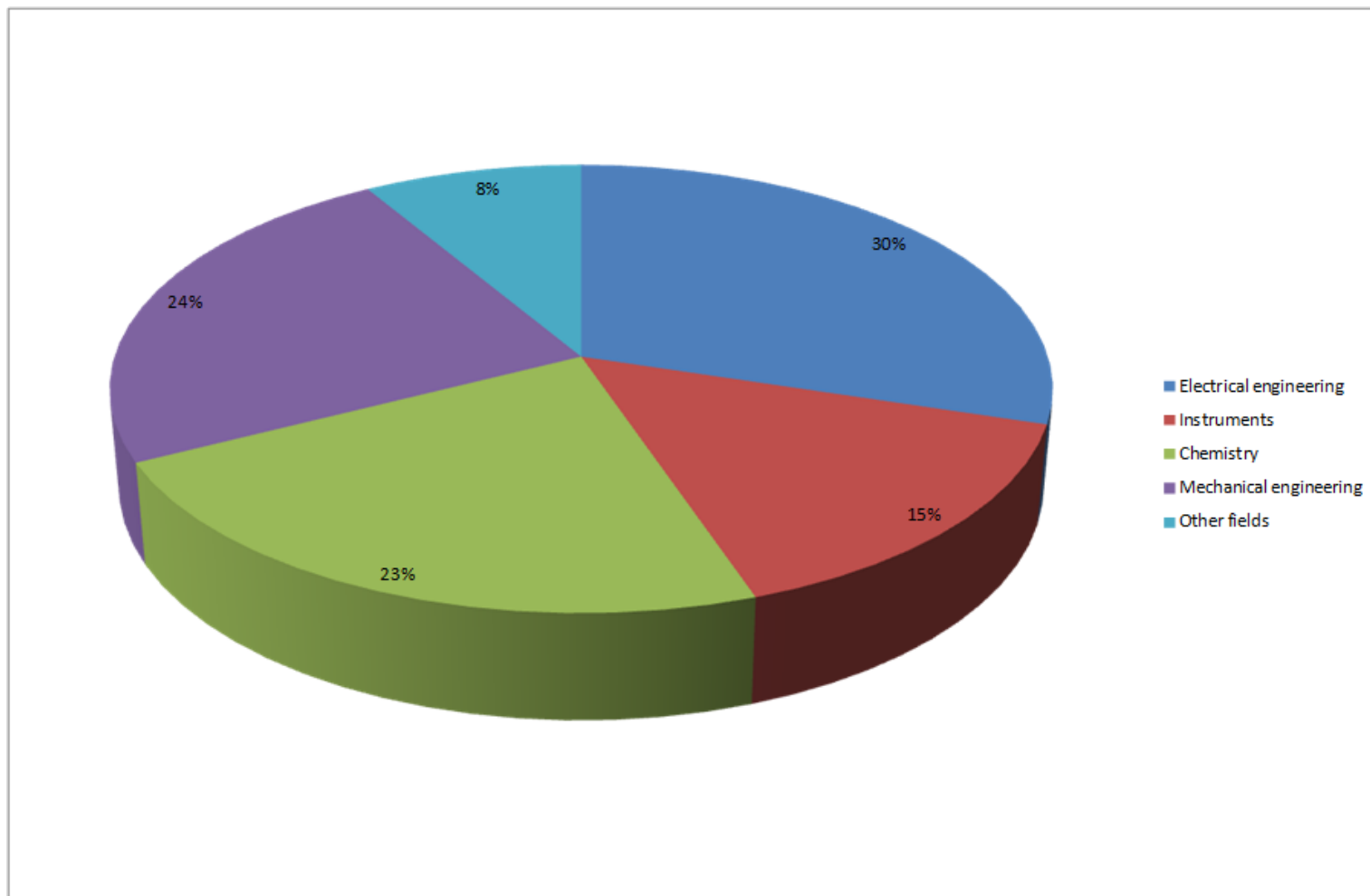
Region	Domestic Applications	Share	Cumulative Share	Growth Rate
US	101359	28.63		2.6
JA	71580.4	20.22	48.85	3.2
EUC	56386.6	15.93	64.78	-0.6
EAH	29991.3	8.47	73.25	6.9
CN	22618.6	6.39	79.64	17.1
EUW	19279.5	5.45	85.09	-0.9
EUE	12447.5	3.52	88.60	0.4
CI	8586.82	2.43	91.03	18.6
OD	7386.32	2.09	93.12	2.4
EUN	7136.66	2.02	95.13	0.4
EUS	7046.04	1.99	97.12	3.0
AM	3338.24	0.94	98.07	2.1
AFS	2267.7	0.64	98.71	9.4
IN	1420.46	0.40	99.11	4.9
EAO	1152.8	0.33	99.43	20.2
WA	884.34	0.25	99.68	7.2
ACX	730.38	0.21	99.89	3.2
AFN	279.6	0.08	99.97	12.8
ASO	114.32	0.03	100.00	8.5

R&D Intensity by AUGUR Region – 1996-2009

AUGUR Region	R&D / GDP	Growth rate of R&D / GDP
JA	3.154	1.7
EUN	2.749	1.91
US	2.627	0.7
OD	2.234	2.4
EUC	2.139	1.11
EUW	1.779	0.1
EAH	1.77	4.49
CI	1.101	1.94
EUS	1.034	5.46
IN	0.735	1.4
EUE	0.643	0.9
CN	0.558	4.6
AFN	0.425	-1.09
WA	0.357	2.1
AM	0.343	2.82
AFS	0.33	2.78
ASO	0.217	6.9
ACX	0.216	-0.6
EAO	0.168	6.3

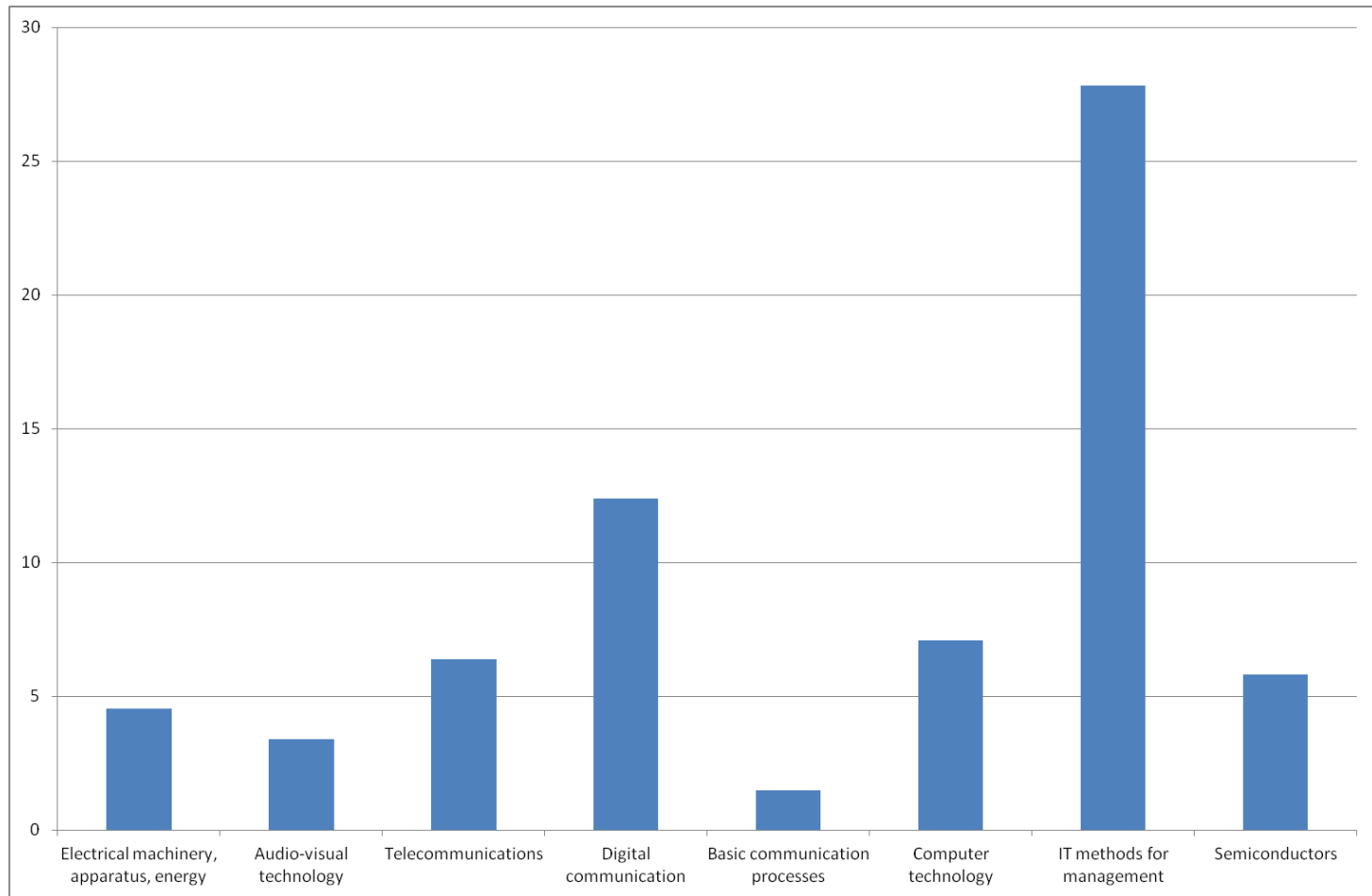
Patent Applications by Broad Technology Class – 1990-2007

(source: WIPO)



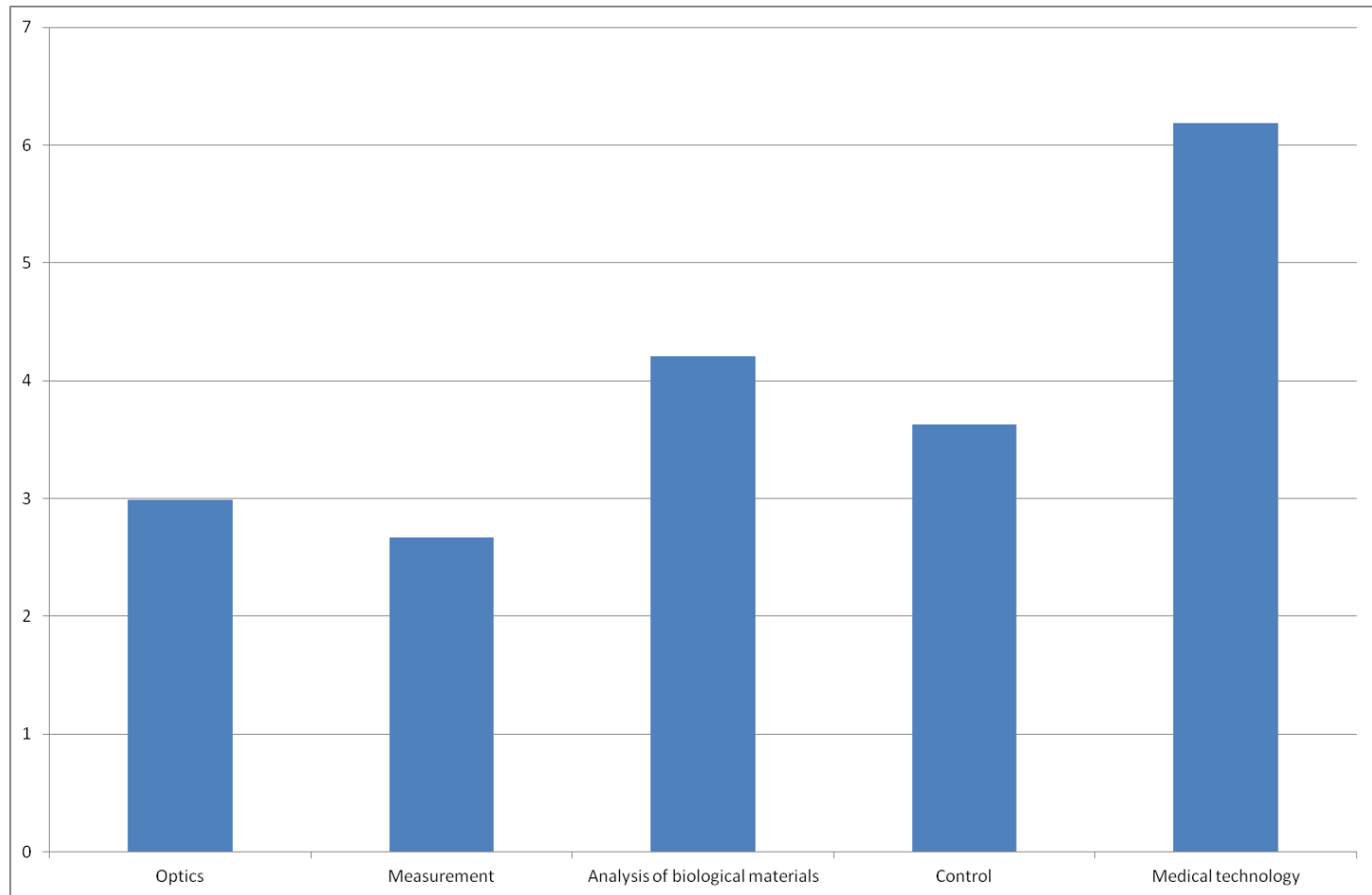
Growth Rate of Patent Applications in Electrical Engineering – 1990-2007

(source: WIPO)



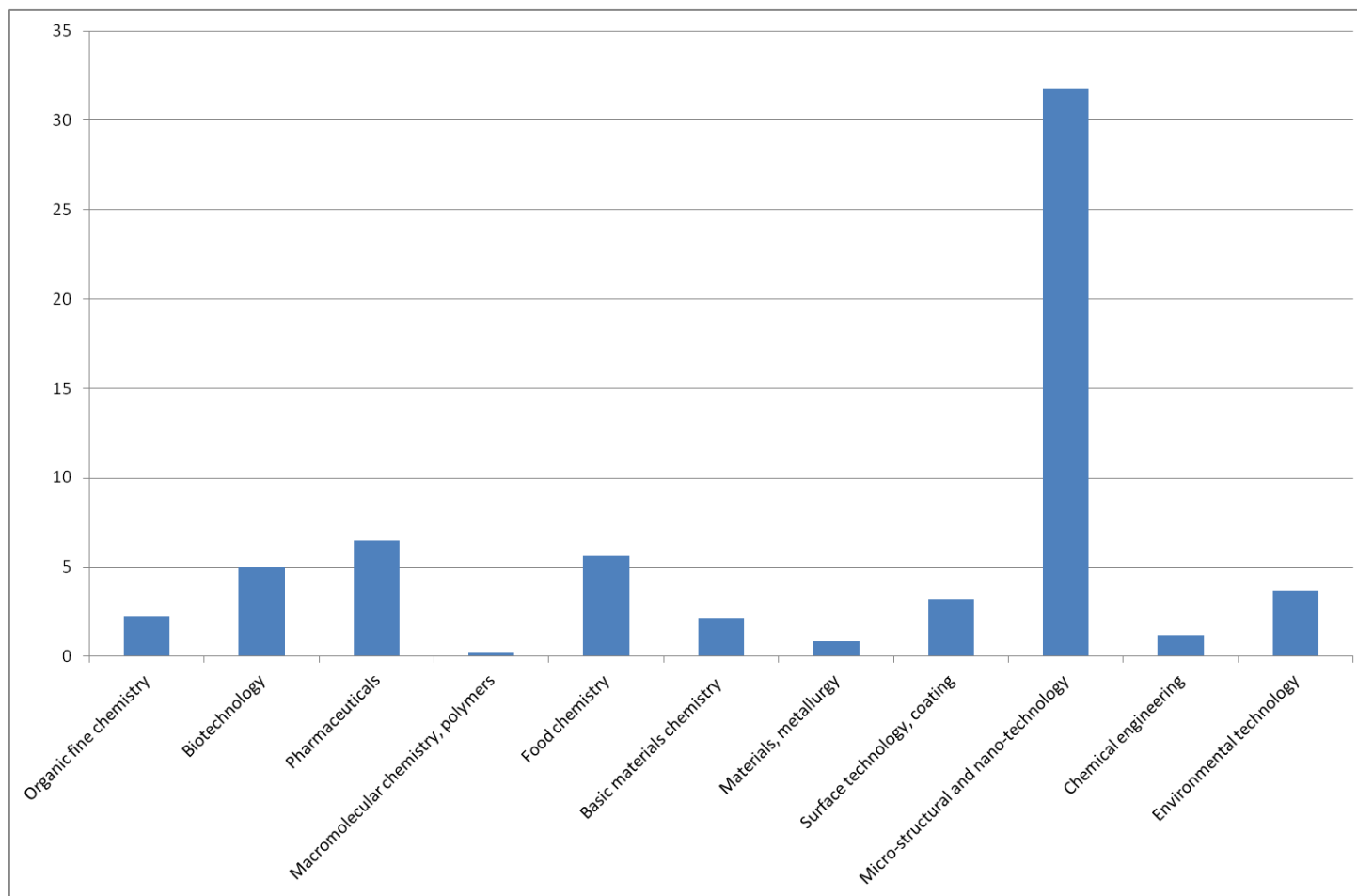
Growth Rate of Patent Applications in Instruments – 1990-2007

(source: WIPO)



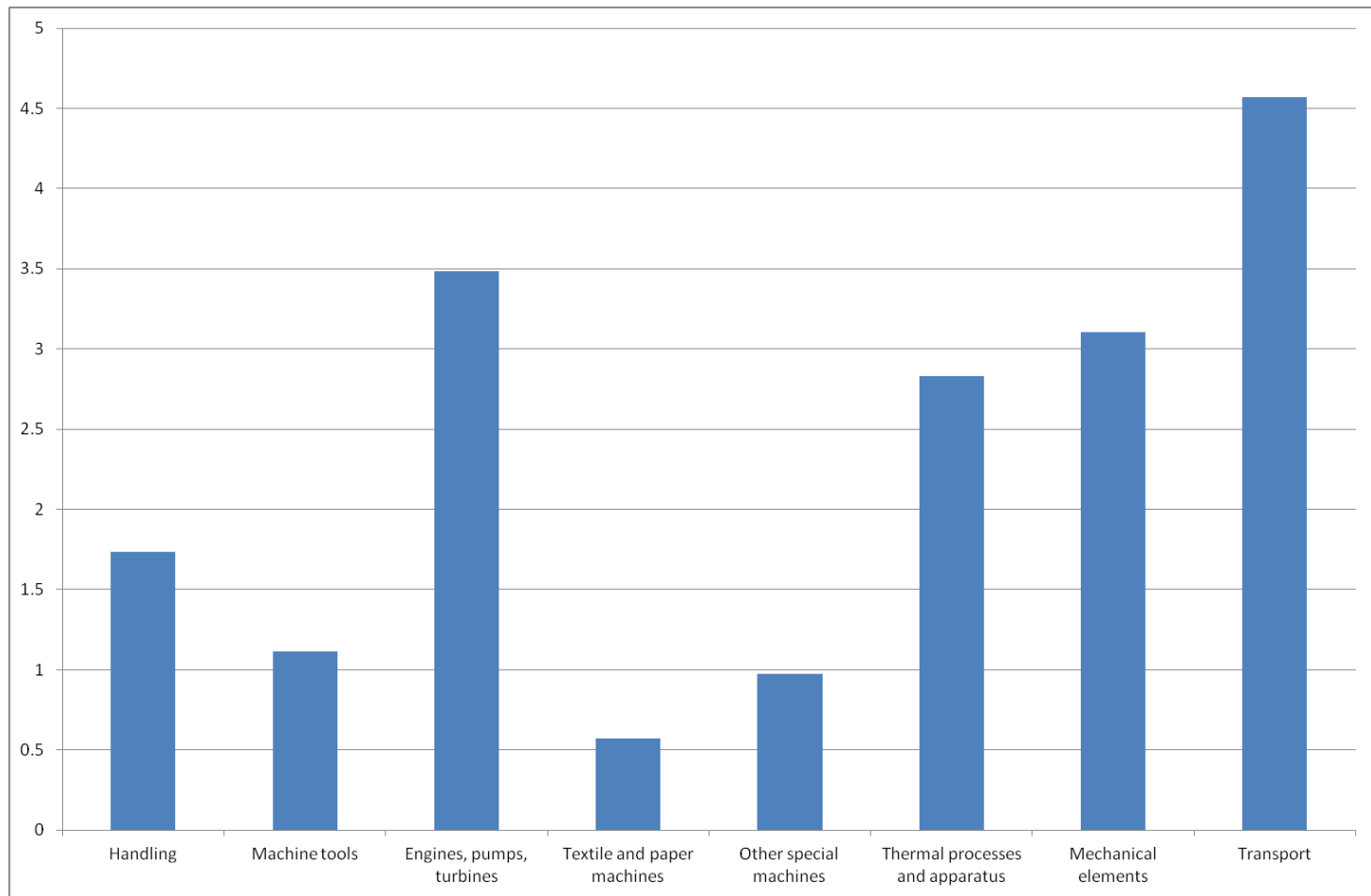
Growth Rate of Patent Applications in Chemistry – 1990-2007

(source: WIPO)

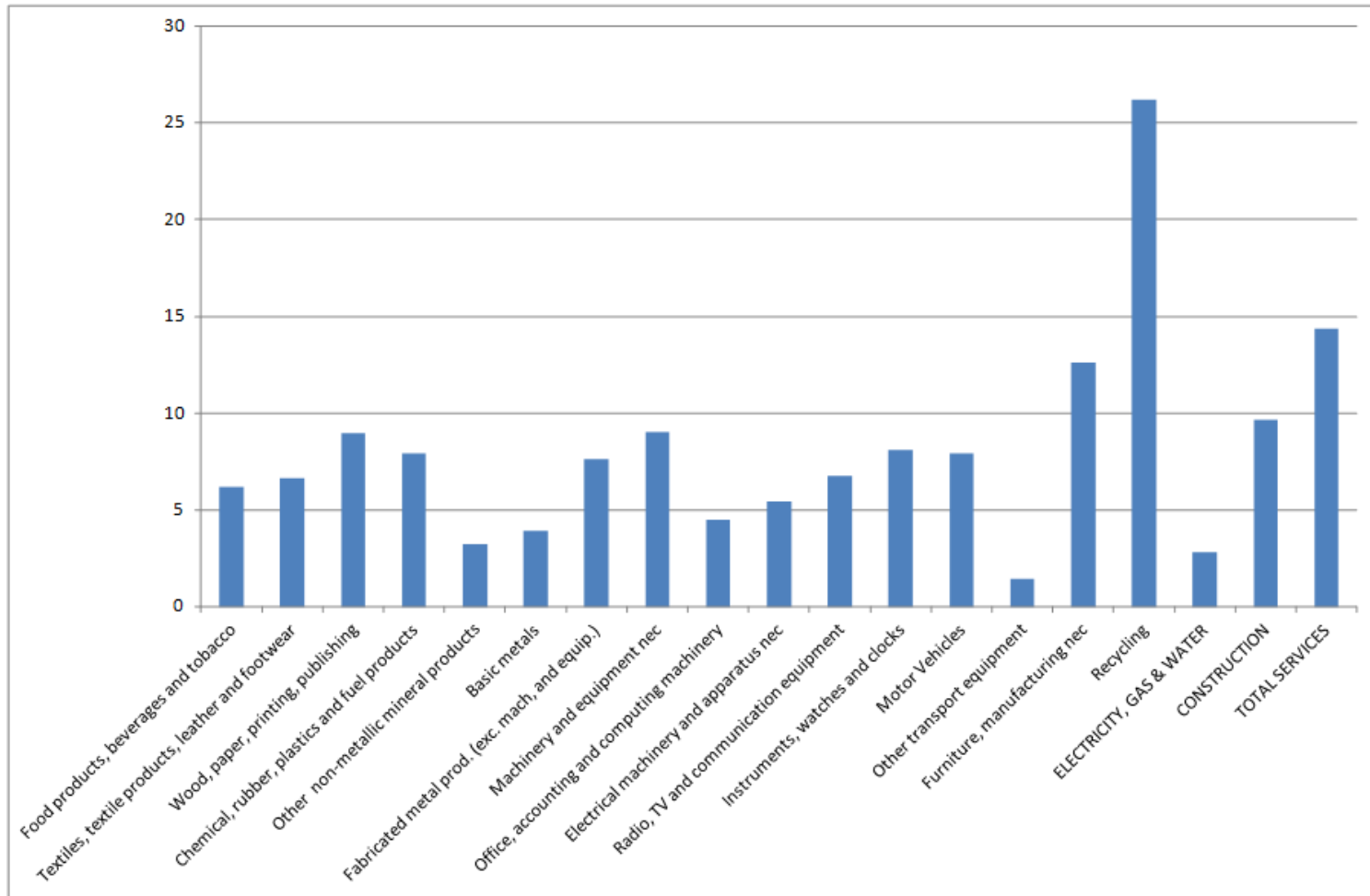


Growth Rate of Patent Applications in Mechanical Engineering – 1990-2007

(source: WIPO)

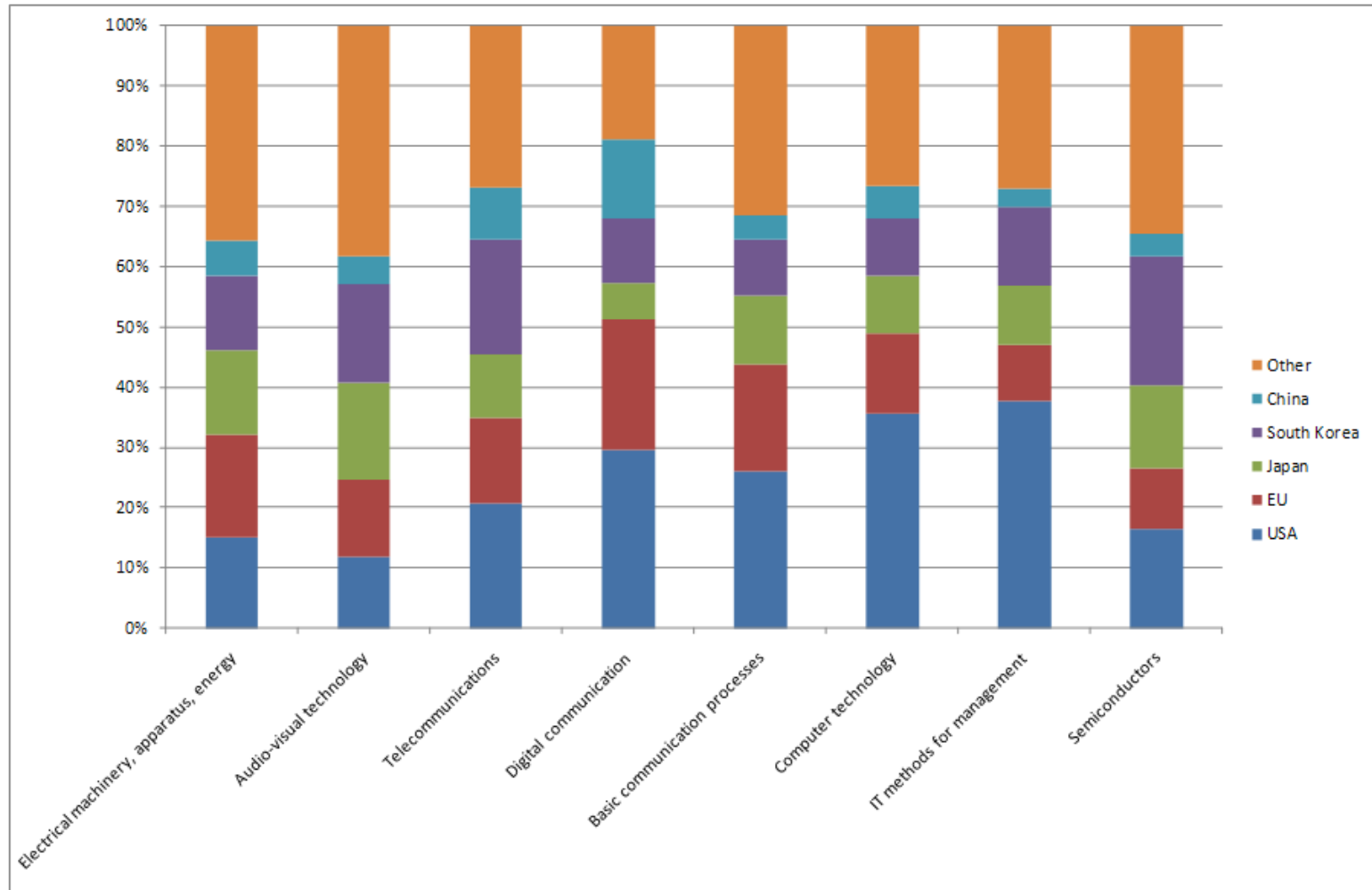


Growth Rate of R&D Spending by Industry – 1987-2006



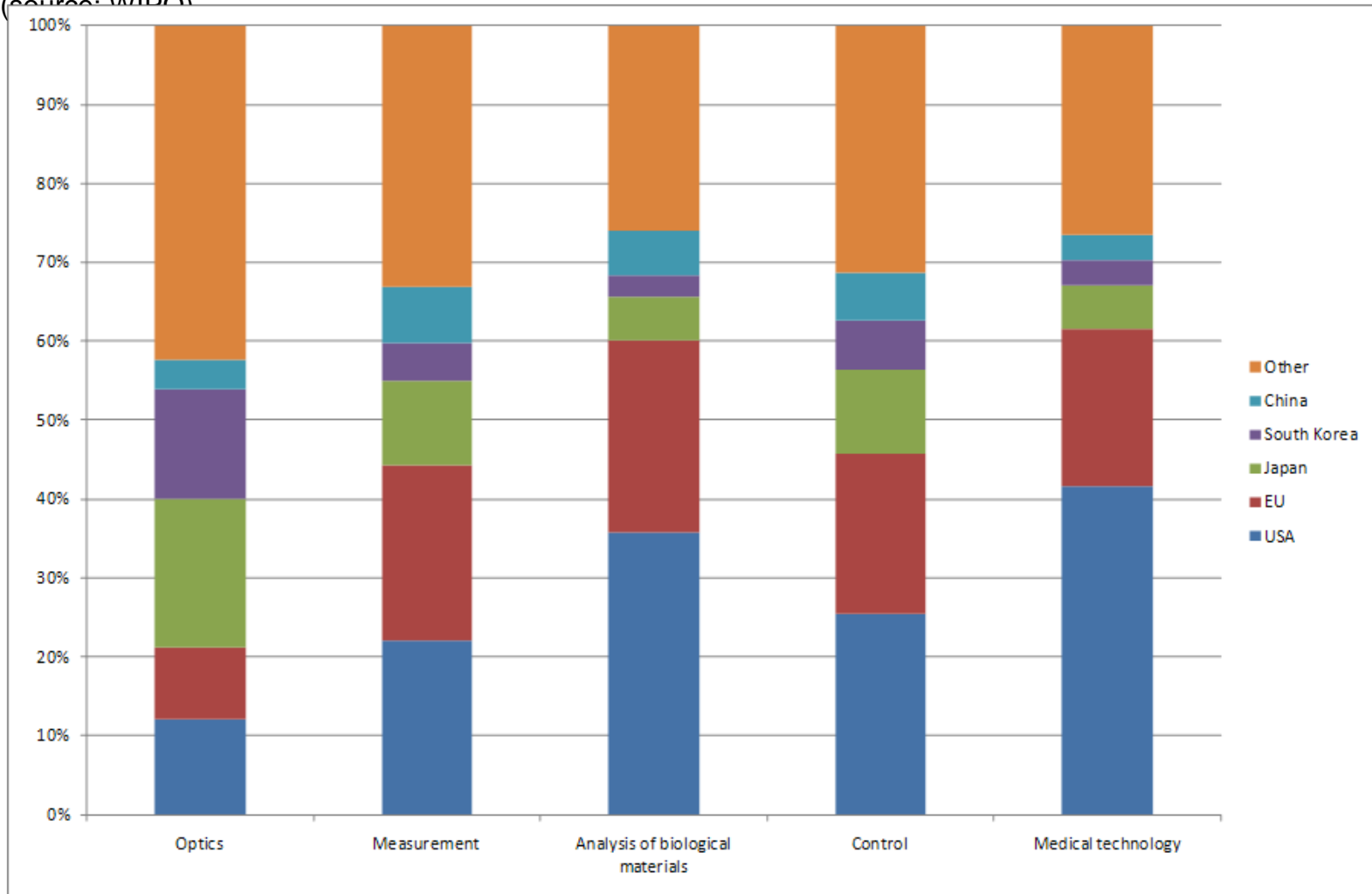
Share of Patent Applications in Electrical Engineering – 2003-2007

(source: WIPO)



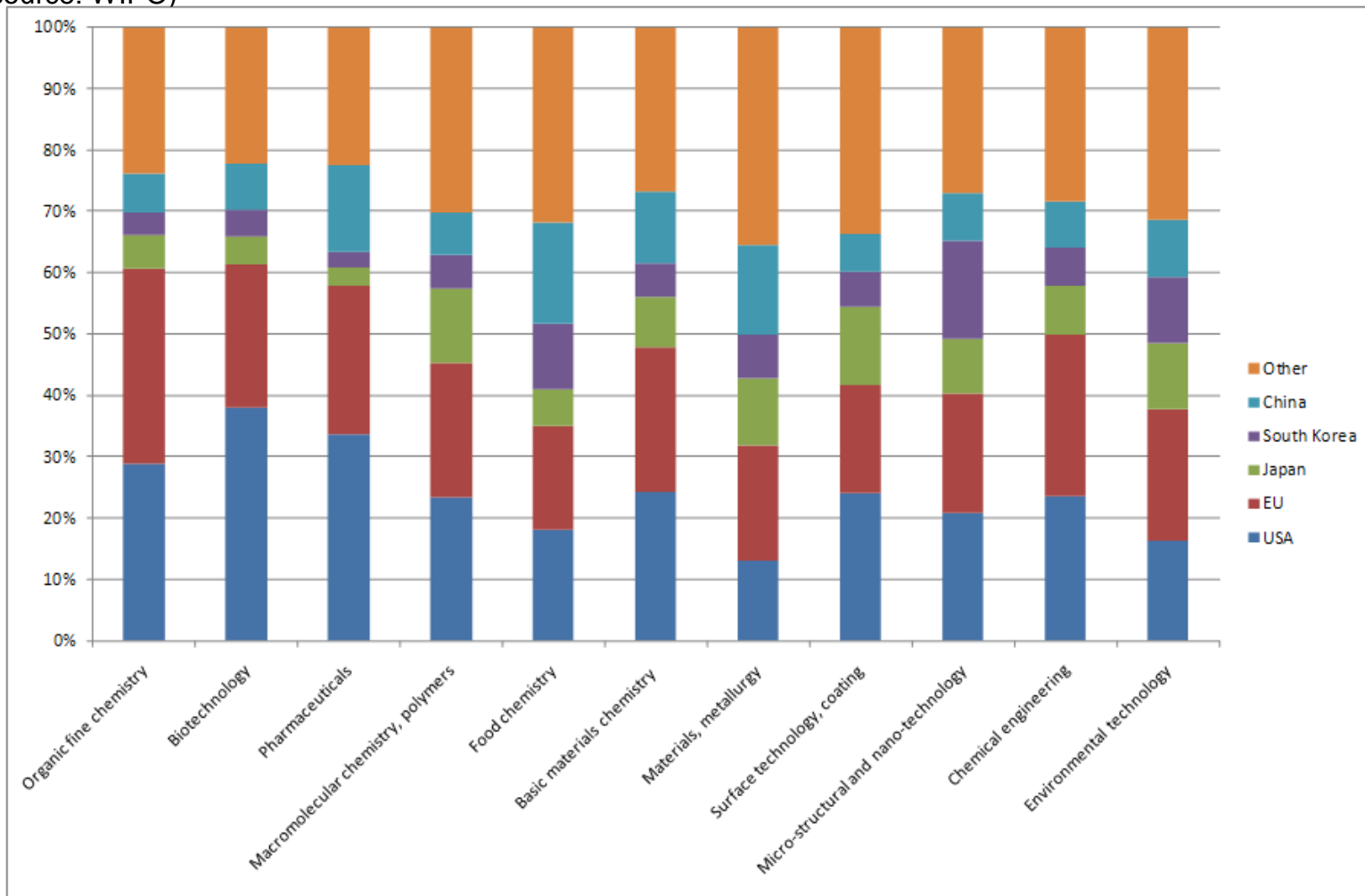
Share of Patent Applications in Instruments – 2003-2007

(source: WIPO)



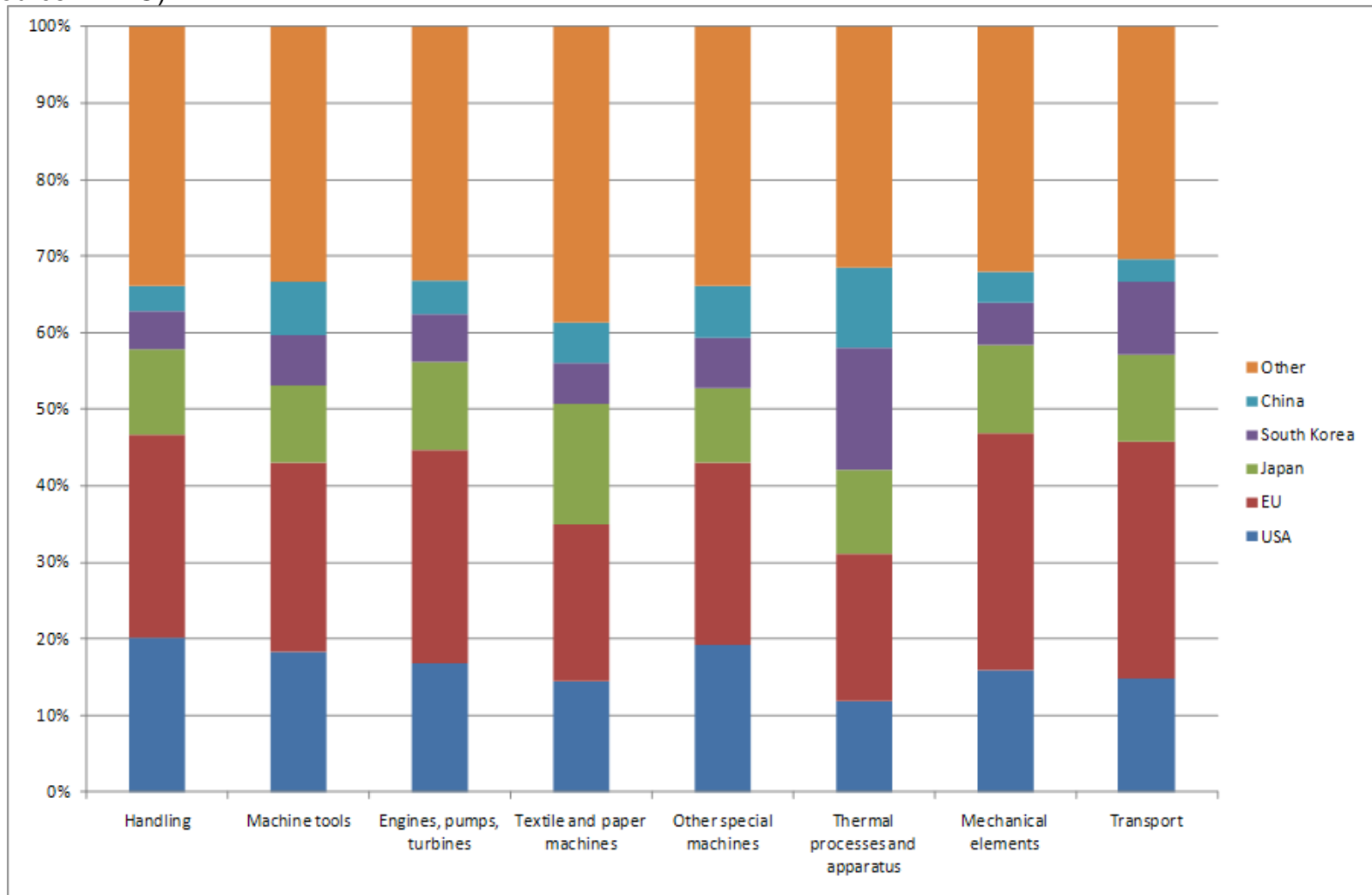
Share of Patent Applications in Chemistry – 2003-2007

(source: WIPO)



Share of Patent Applications in Mechanical Engineering – 2003-2007

(source: WIPO)



Summary of Developments in Innovative Activity

- The vast majority of R&D and patent applications is/are still conducted/held by a small number of advanced countries
 - But other countries – particularly China and the Republic of Korea – have become more important and have seen a rapid expansion in innovative activities
- There have been substantial changes in the industry or technology sectors in which innovation takes place
 - Majority of patent applications still in traditional sectors such as electrical apparatus, transport, medicine, etc as well as currently relevant sectors such as computer technology
 - Rapidly expanding technology sectors in terms of patent applications are IT methods for management; digital communication; and nano-technology – though they still account for a small share of overall patent applications
 - Rapidly expanding industries in terms of R&D spending are furniture and manufacturing; recycling; and services
- The internationalisation of R&D has been increasing in recent years. Flows of R&D follow flows of FDI very closely.

WP3 ('Trade and Technology') and AUGUR Scenarios

- Reduced government:
 - Rapid growth of select group of EMEs and link to catching-up
 - Club convergence: non-linearities/thresholds and absorption capabilities
- Bipolar scenario (US-China):
 - Strong bias towards regional integration in Europe and increasingly in Asia
 - What will remain of globalisation and international production networks?
- Regionalisation:
 - Strong
 - st
- Multipolar:
 - Strong
 - st