

# S&T indicators reveal rapid strengthening in Asian research systems

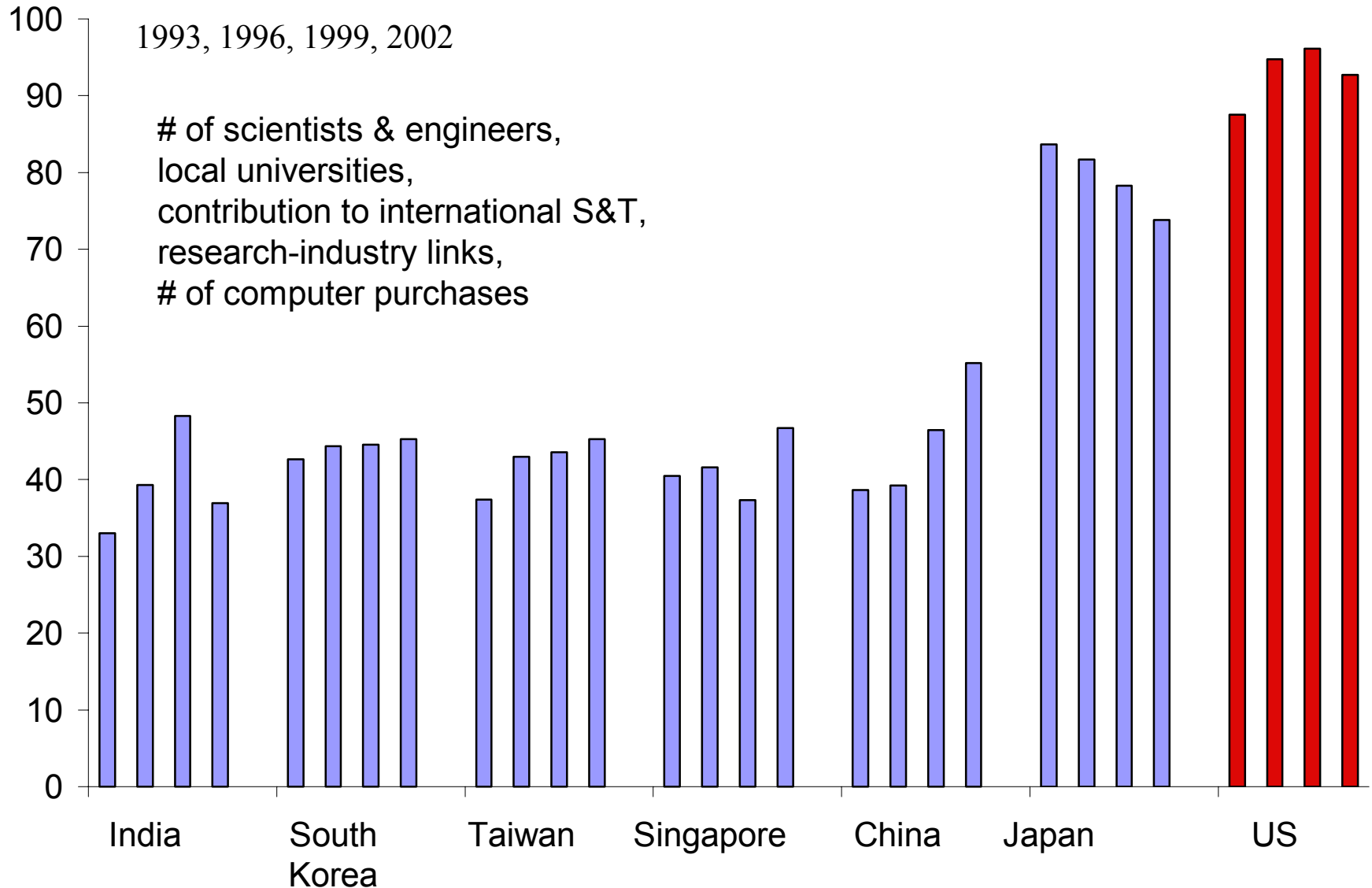
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29<sup>th</sup> AAAS Forum on S&T Policy  
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Hyatt Regency Washington on Capitol Hill

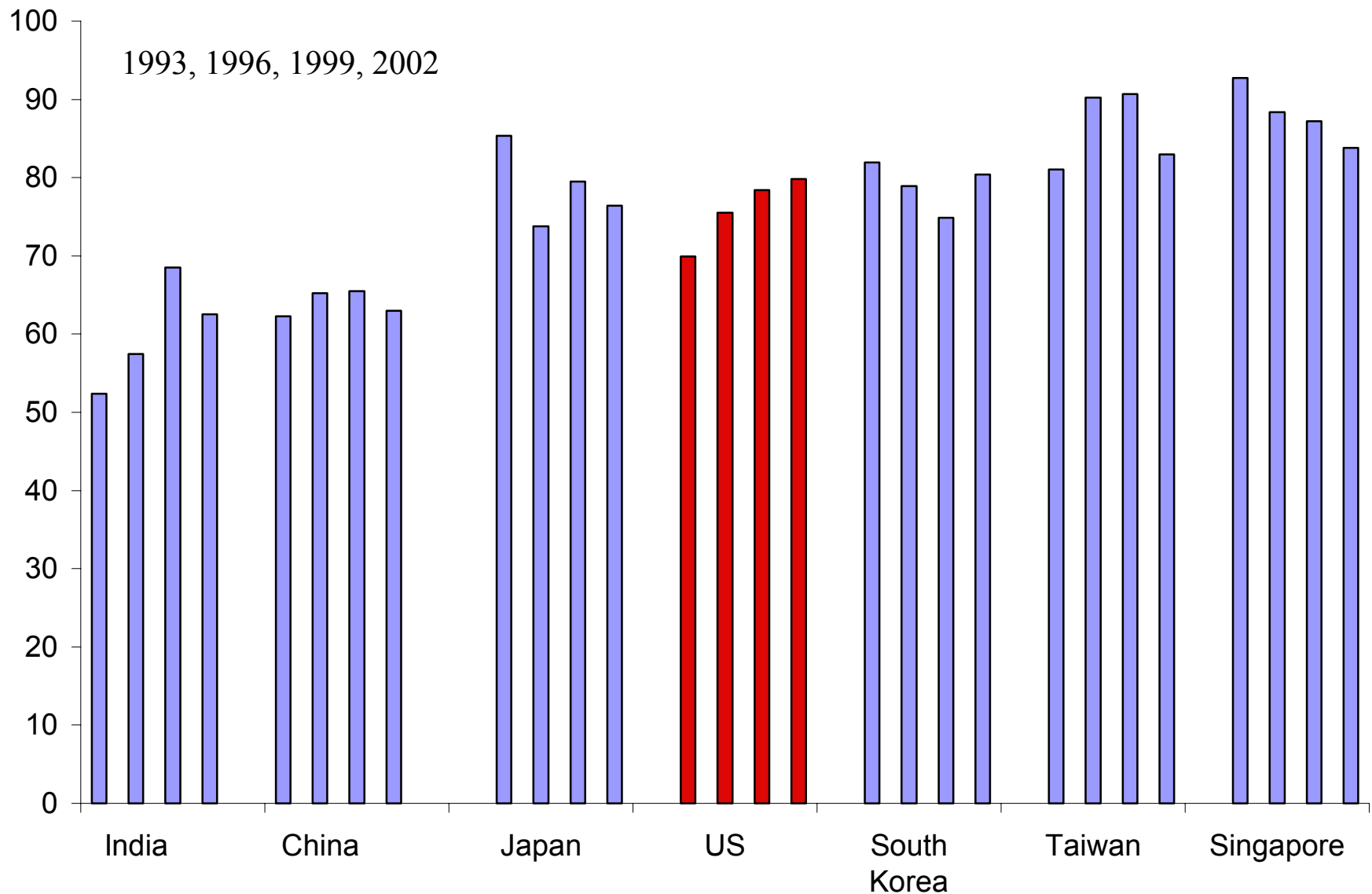
# Overview

- Strengthening Asian S&T systems
- Step-by-step or firing on all cylinders?
- Perceptions
- High growth – small systems, less impact
- A choice

# Nation's capacity to develop, produce and market new technology

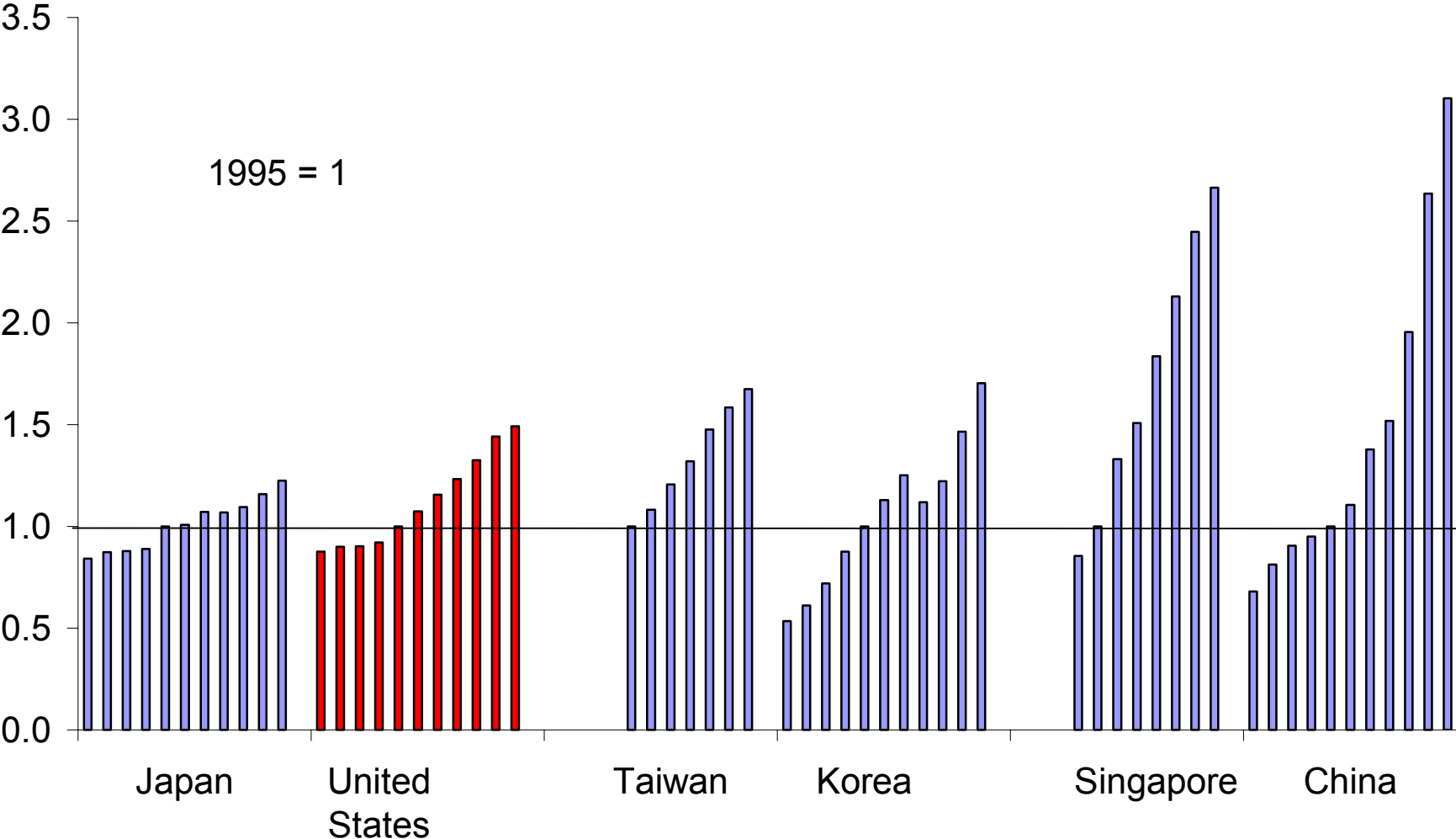


# Cultural and policy support for technology based development and entrepreneurship



Source: A.L. Porter, et. al, Indicators of Technology-Based Competitiveness of 33 Nations: 2003 Summary Report, April 2003, TPAC, Georgia Institute of Technology, [www.tpac.gatech.edu](http://www.tpac.gatech.edu).

# Growth in GERD 1991-2001



Gross Domestic Expenditure on R&D -- GERD (billion current PPP \$)

104

275

11

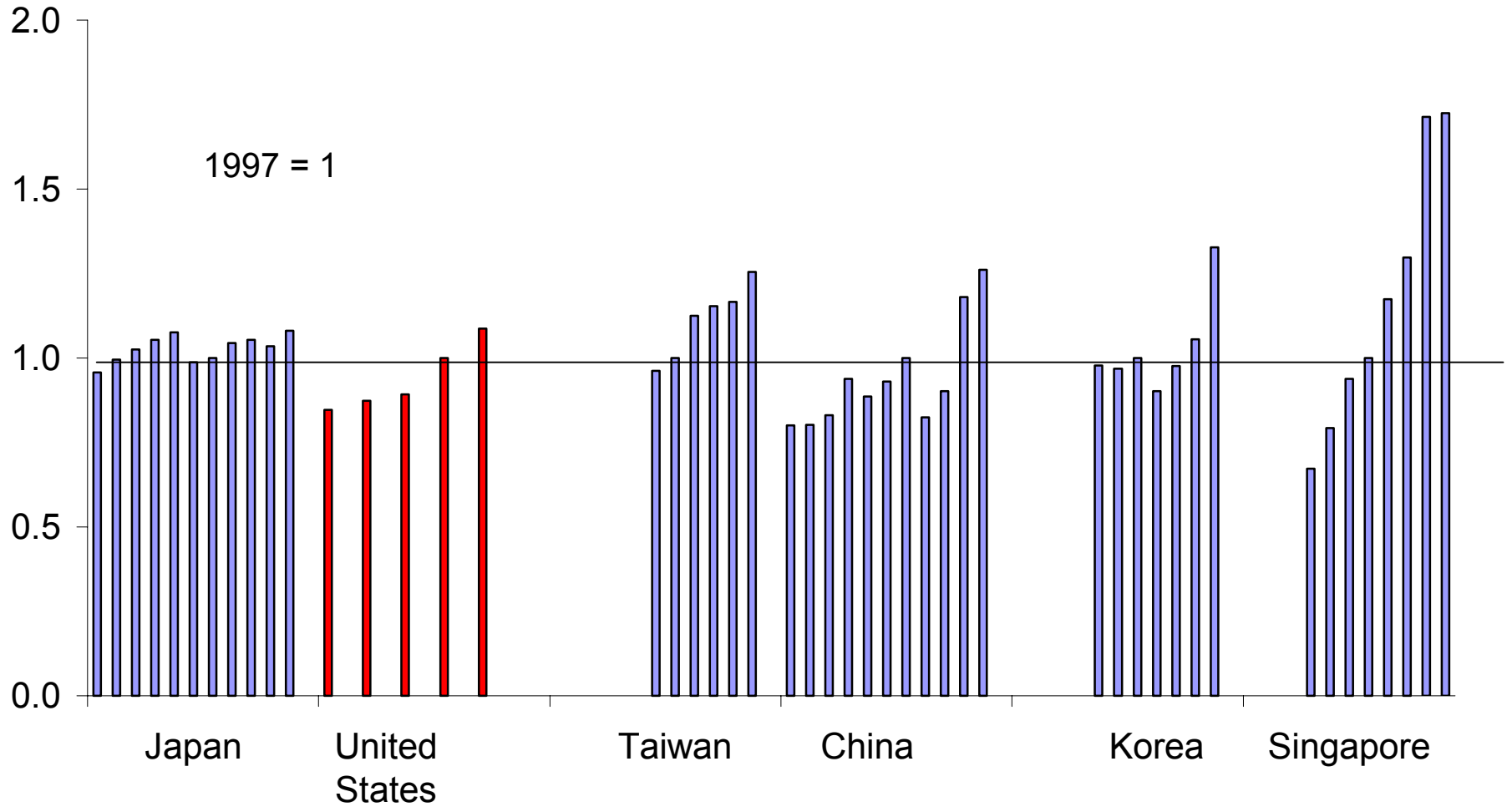
22

2

57

Source: OECD

# Growth in total researchers (FTE) 1991-2001



Total researchers (FTE) in thousands, 2001:

676

1,261 ('99)

60

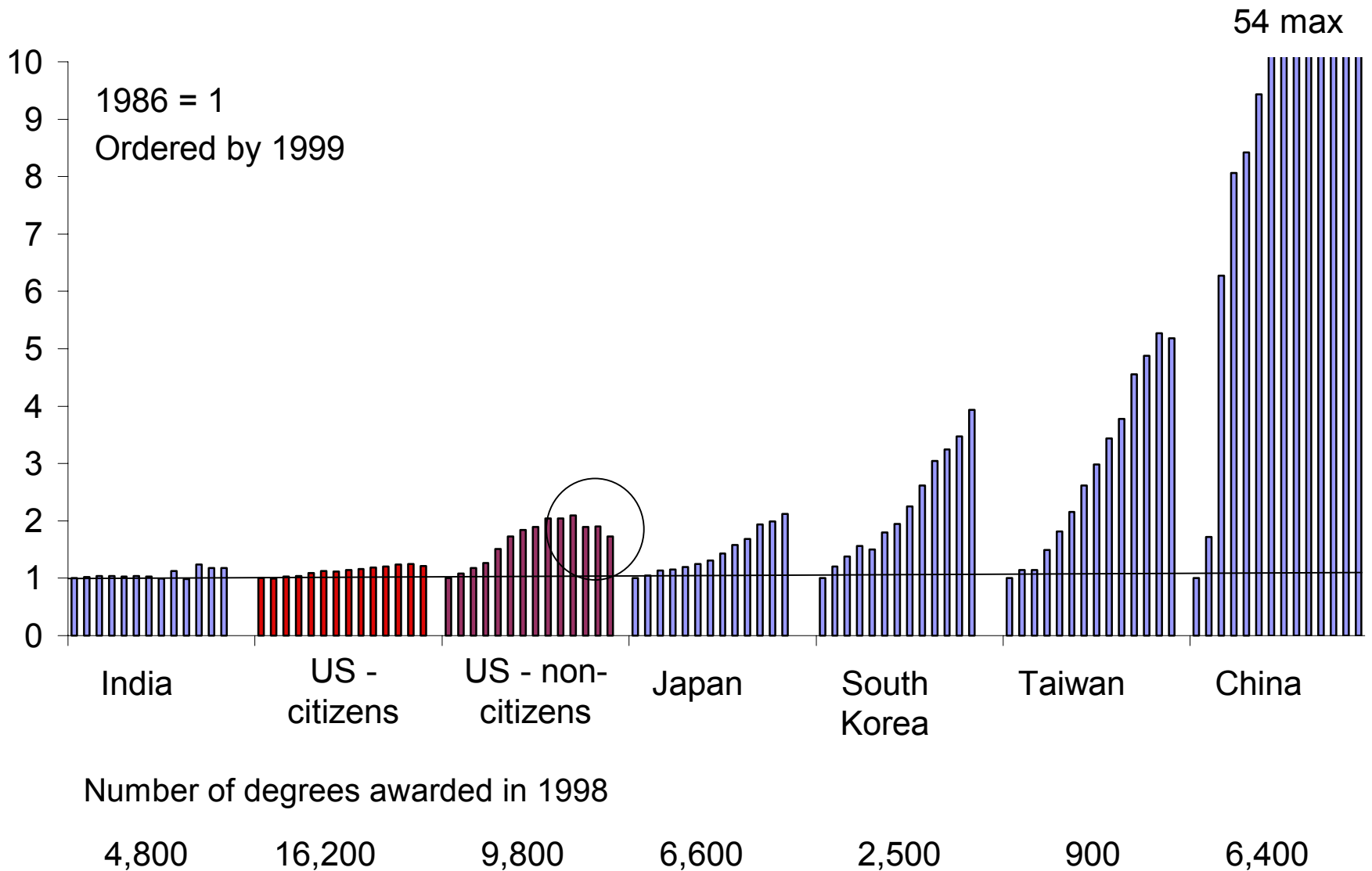
743

136

17

Source: OECD

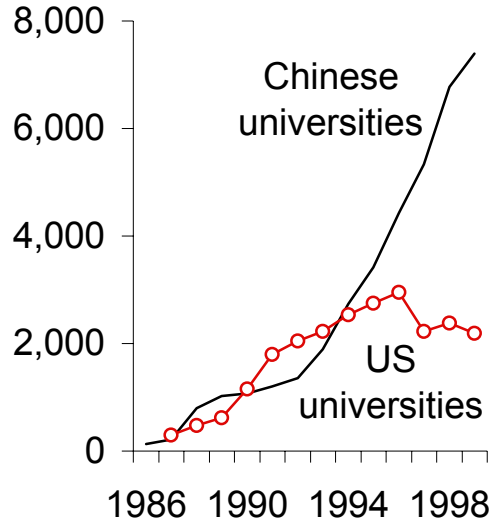
# Growth in doctoral degrees awarded 1986-1999



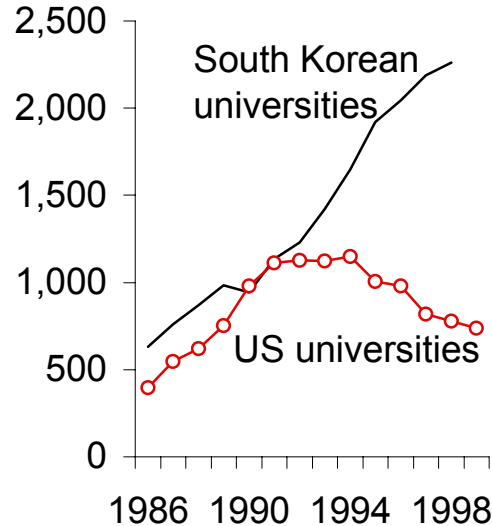
# Where do Asian students study for their PhD?

1986-1999

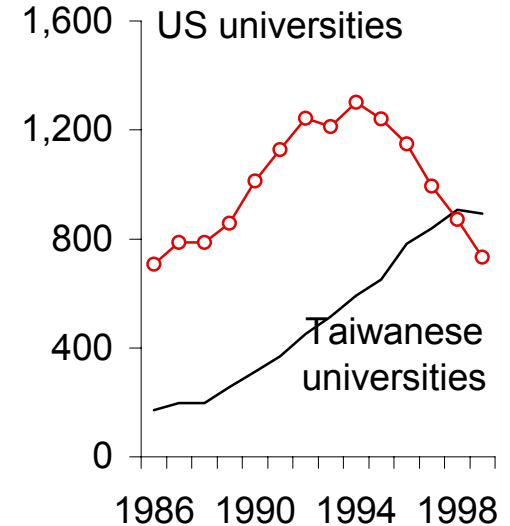
### Chinese students



### South Korean students



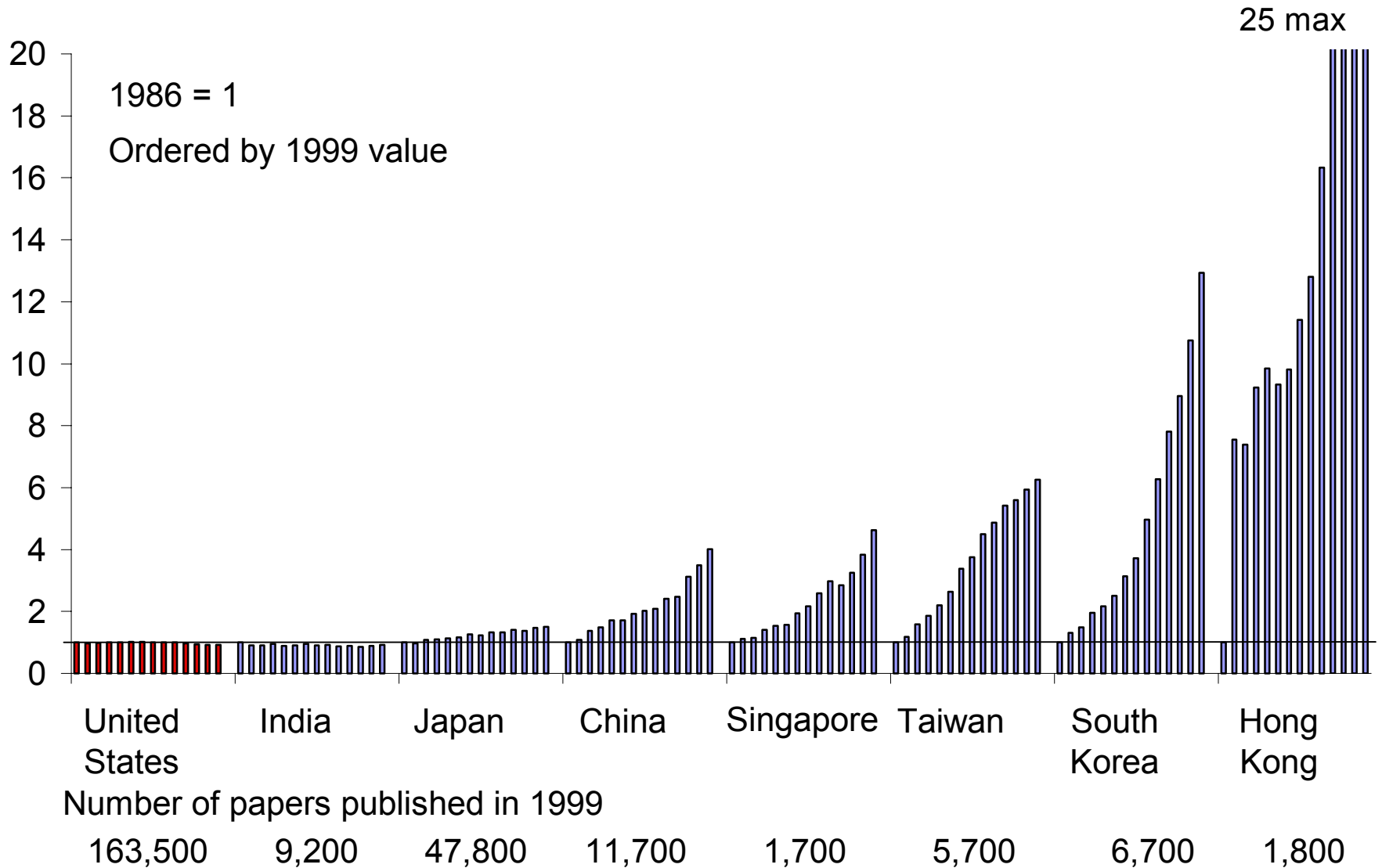
### Taiwanese students



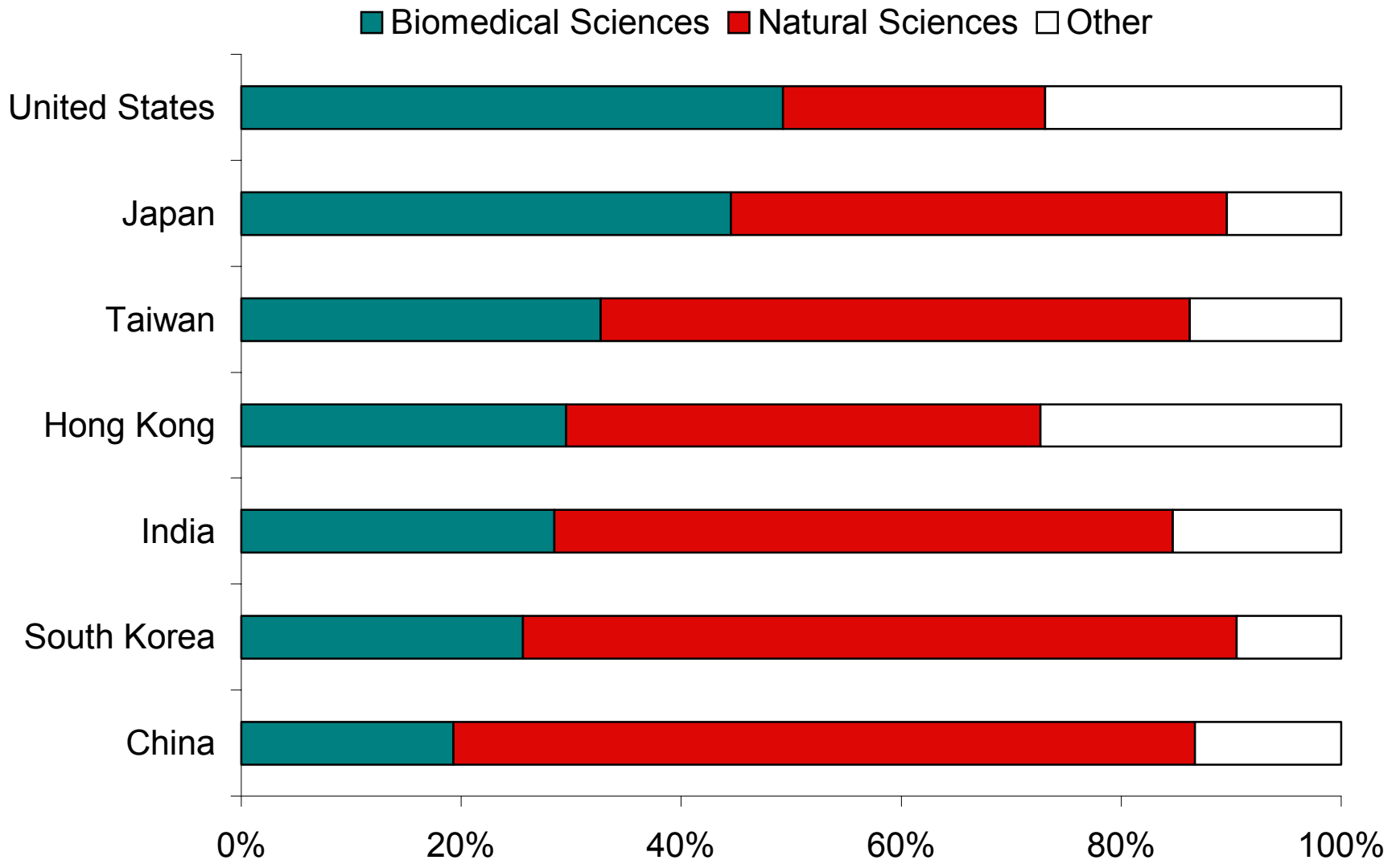
Source: NSF Science & Engineering Indicators 2002, appendix table 2-41



# Growth in number of SCI-indexed papers 1986-1999

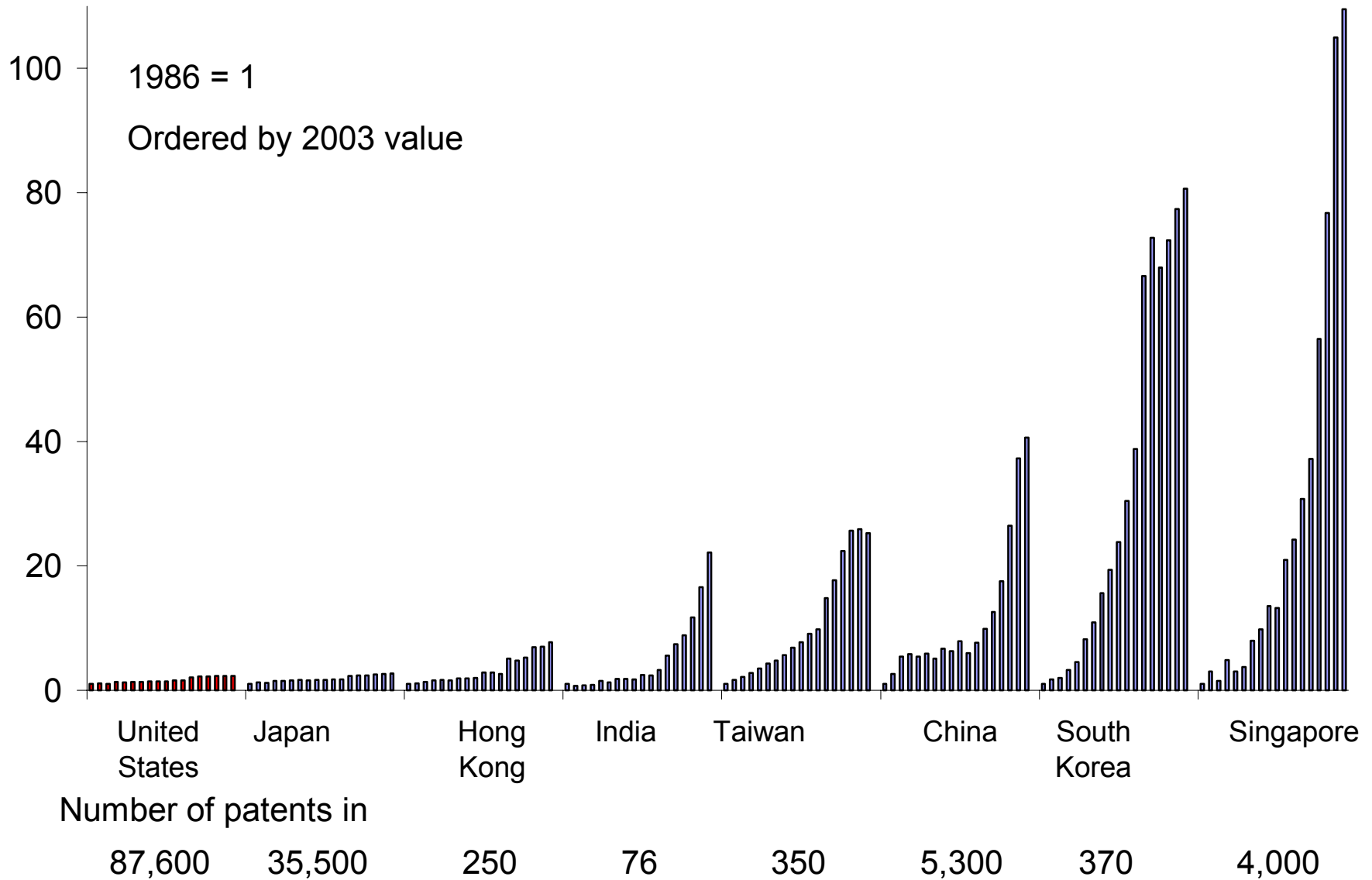


# Field distribution of national scientific output - 1999



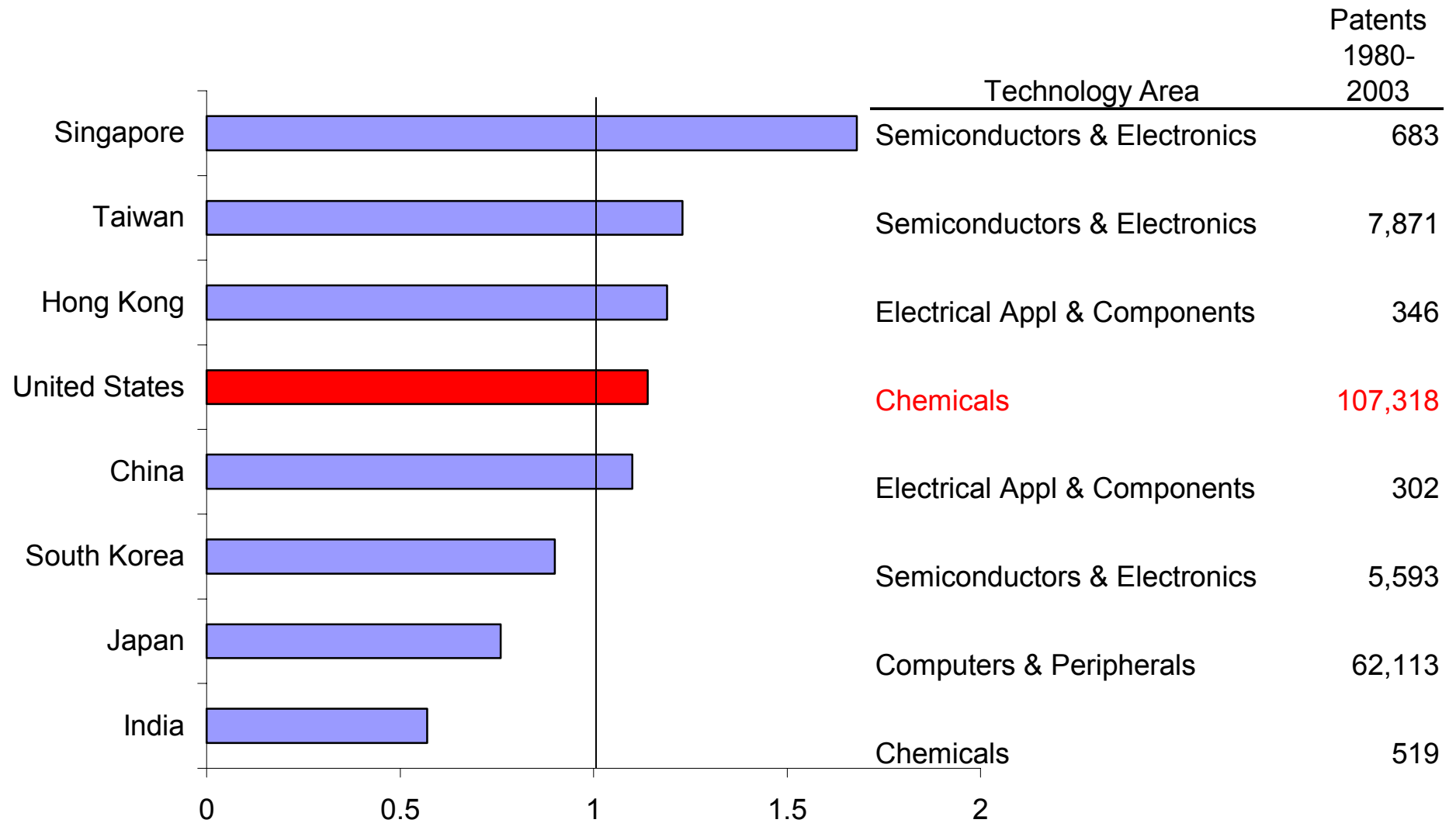
Source: NSF Science & Engineering Indicators 2002, appendix table 5.43

# Growth in U.S patents invented in Asia – 1986-2003



Source: CHI Research, Inc. International Patent Indicators, 2004,

# Patent Citation Index



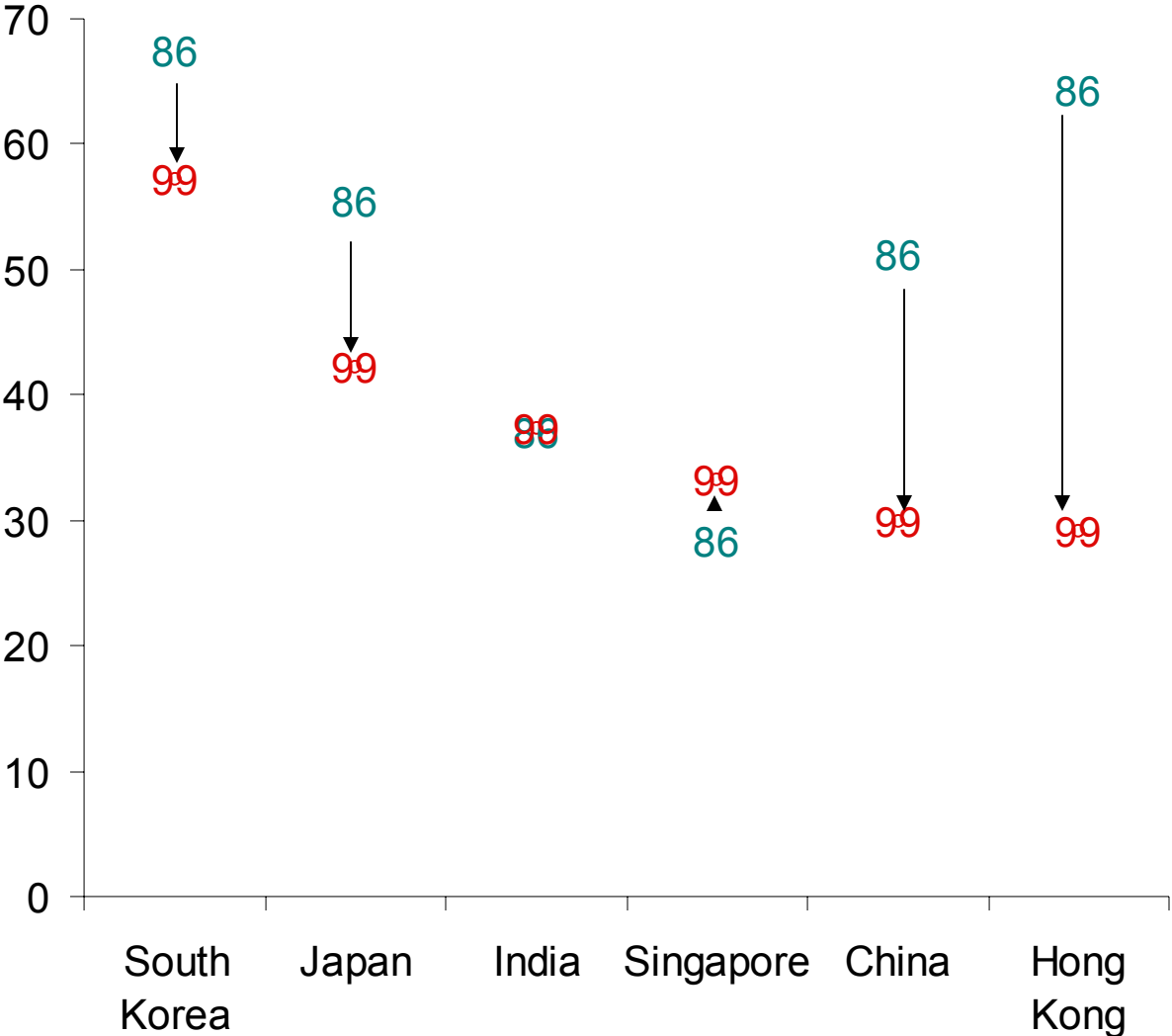
# Movement in citation ratios 1990-1999

Citation ratio = share of world citations/ share of world publications

Region	Cites to region from		What does it mean?
	Self	Rest of World	
Eastern Europe	Up	Way up	Impact of science strengthening at home and abroad
<b>United States</b>	<b>Up</b>	<b>Same/slight drop</b>	<b>Becoming relatively more inward looking</b>
East Asia NIEs	Down	Up	} Becoming more outward looking, globally oriented
Latin America	Down	Up	
Western Europe	Down	Same/slight rise	
Asia and Pacific	Down	Same/slight drop	

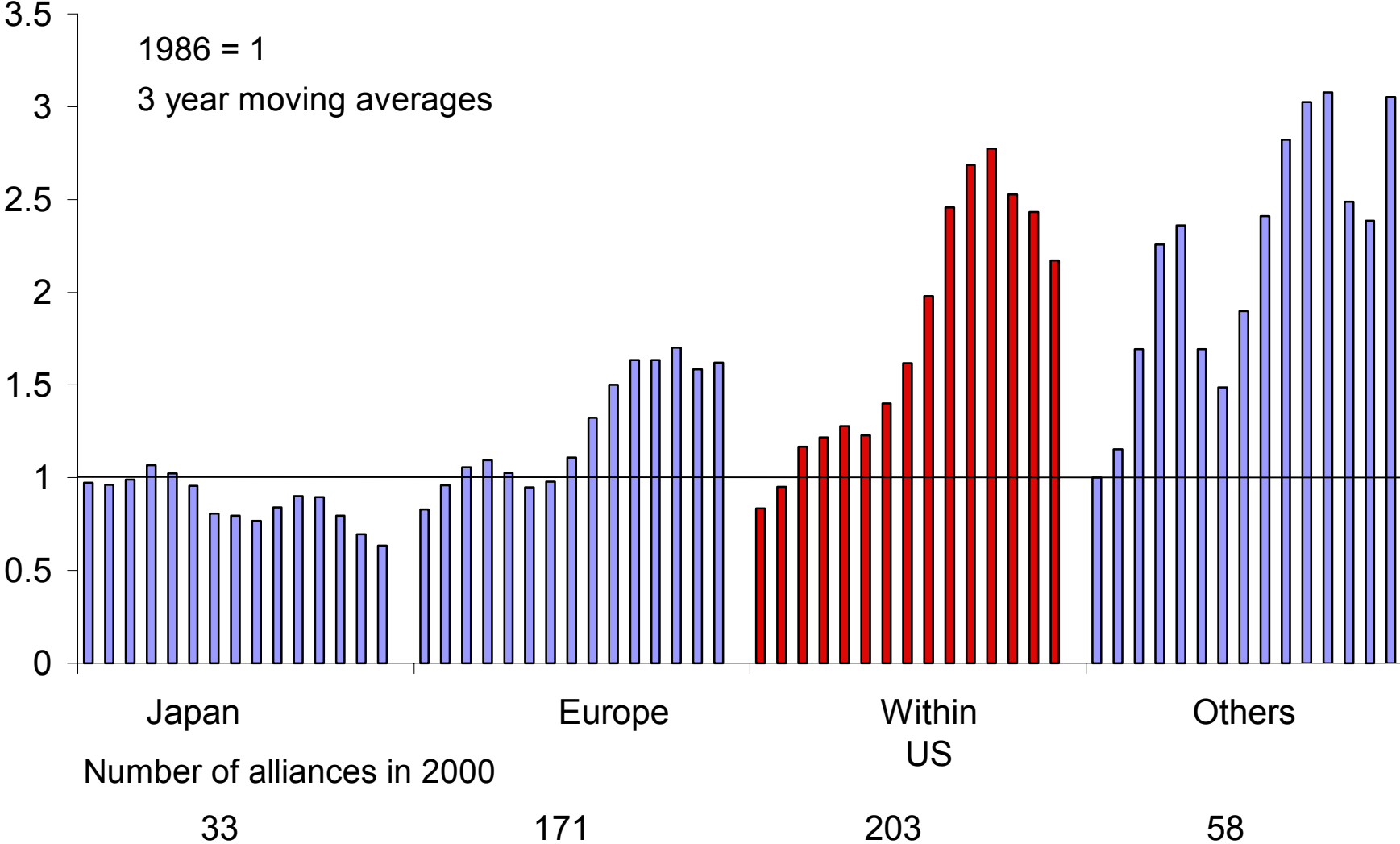
Source: NSF Science & Engineering Indicators 2002, appendix table 5-51

# US share of countries' internationally collaborative papers



Source: NSF Science & Engineering Indicators appendix table 5-48

# Growth in strategic technology alliances with US firms 1986-2000



Source: NSF Science & Engineering Indicators appendix table 4-39

# Implications

- Two levels:
  - Macro – science and technology will advance faster
  - Personal level – greater competition for students, for corporate research support, for limited space in top journals,
  - US may no longer have a monopoly on leading edge S&T and will have to compete harder to maintain its current position