Ageing-Related Diseases:

The health expenditure-technology perspective

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Technological change and health expenditure

- Main determinants of the growth in health expenditures:
  - Ageing populations
  - Income growth
  - Technological change
- Technological change in medical care accounts for at least 50% of the growth in health expenditure (Newhouse 1992)

NEWHOUSE JP (1992)
"Medical Care Costs: How Much Welfare Loss?" Journal of Economic Perspectives, Summer; 6(3): 3-21.

What is medical care technology?

- Capital + labour = techniques
  - Surgical tools, drugs, operating room time, hospital bed
  - Nurses and physicians
  - Knowledge of how these are applied
- Output
  - Survival, quality of life
- Set of all techniques = TECHNOLOGY
  - Process of performing PTCA

Technological change

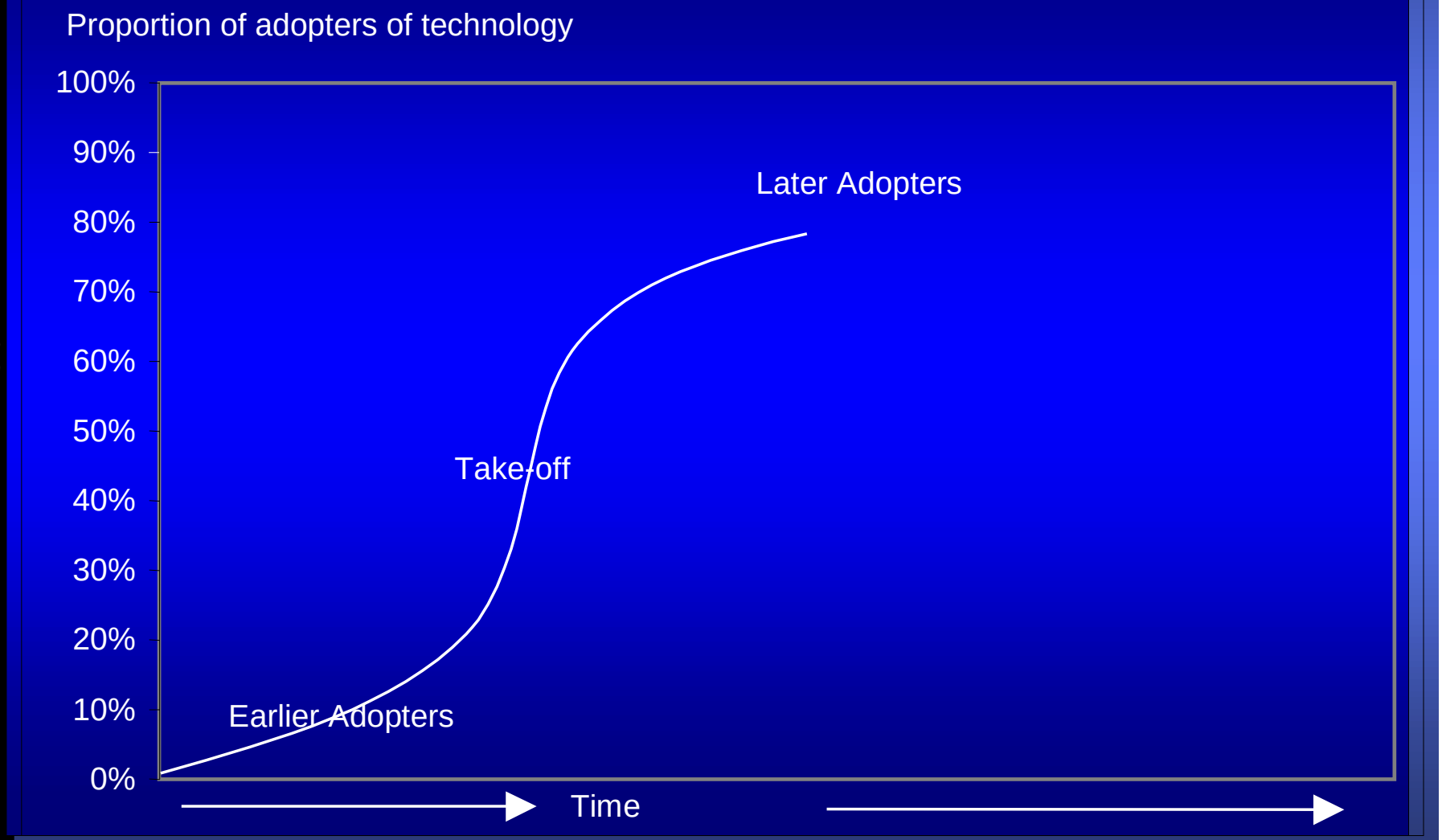
- Technological change (innovation)
  - Usually assumed to be progressive
- New inventions
  - Coronary artery bypass grafts - CABG (1960s)
  - Angioplasty and thrombolytic drug therapy (1970s)
- Improvements to existing techniques
  - Minimally invasive CABG
  - Intracoronary stents
  - Improved drugs

Identifying technology in medical care

- Consensus on main cause of rising health expenditures but why are there not more studies?
- Technology in medical care difficult to measure
- Proxies for technological change
- Cutler and McClellan (1996)
  - Acute myocardial infarction
  - Technological change responsible for *more* than 50% of the growth in health expenditures

CUTLER DM AND McCLELLAN (1996)
"The Determinants of Technological Change in Heart Attack Treatment," National Bureau of Economic Research, Working Paper 5751.

S-shaped curve of technology diffusion



A framework for technological change

- Three mechanisms through which technological change can affect health expenditures (Gelijns and Rosenberg 1996):

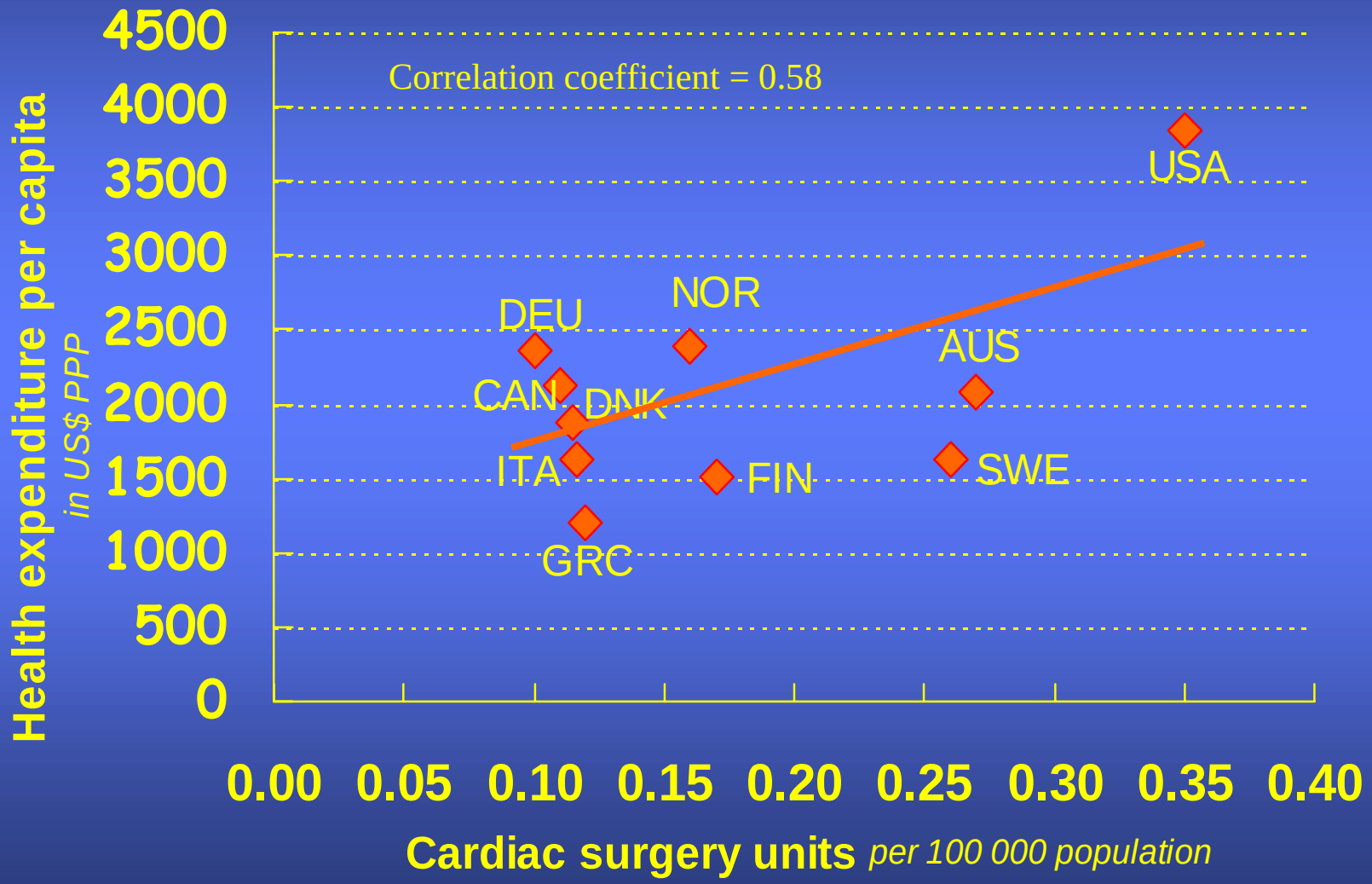
① Introduction of new or modified technologies

② Intensity of use of existing technologies

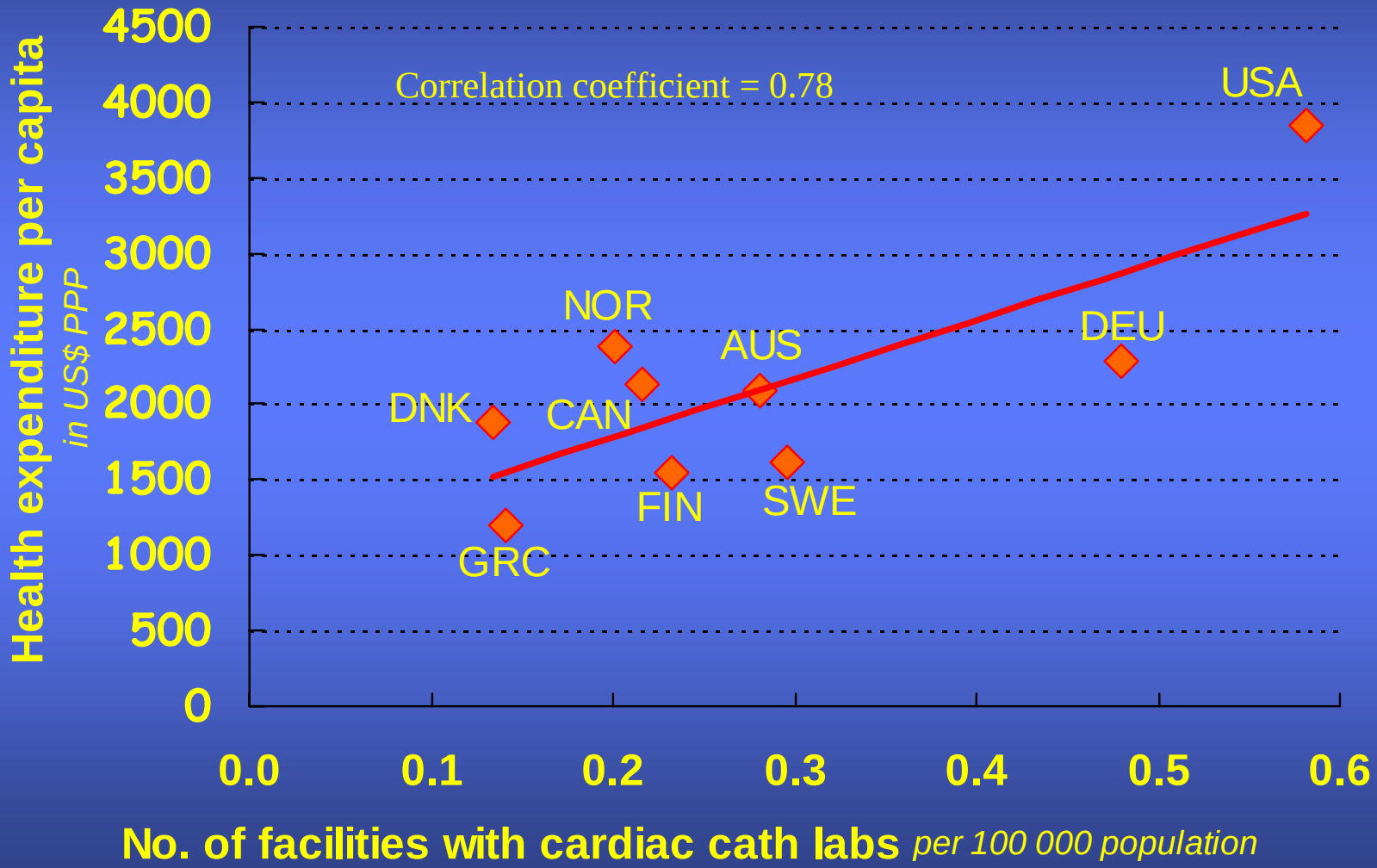
③ Expanded application of new technologies

GELIJNS AC AND ROSENBERG N (1996)
"The dynamics of technological change in medicine," *Health Affairs*, Summer 1994 13: 28-46.

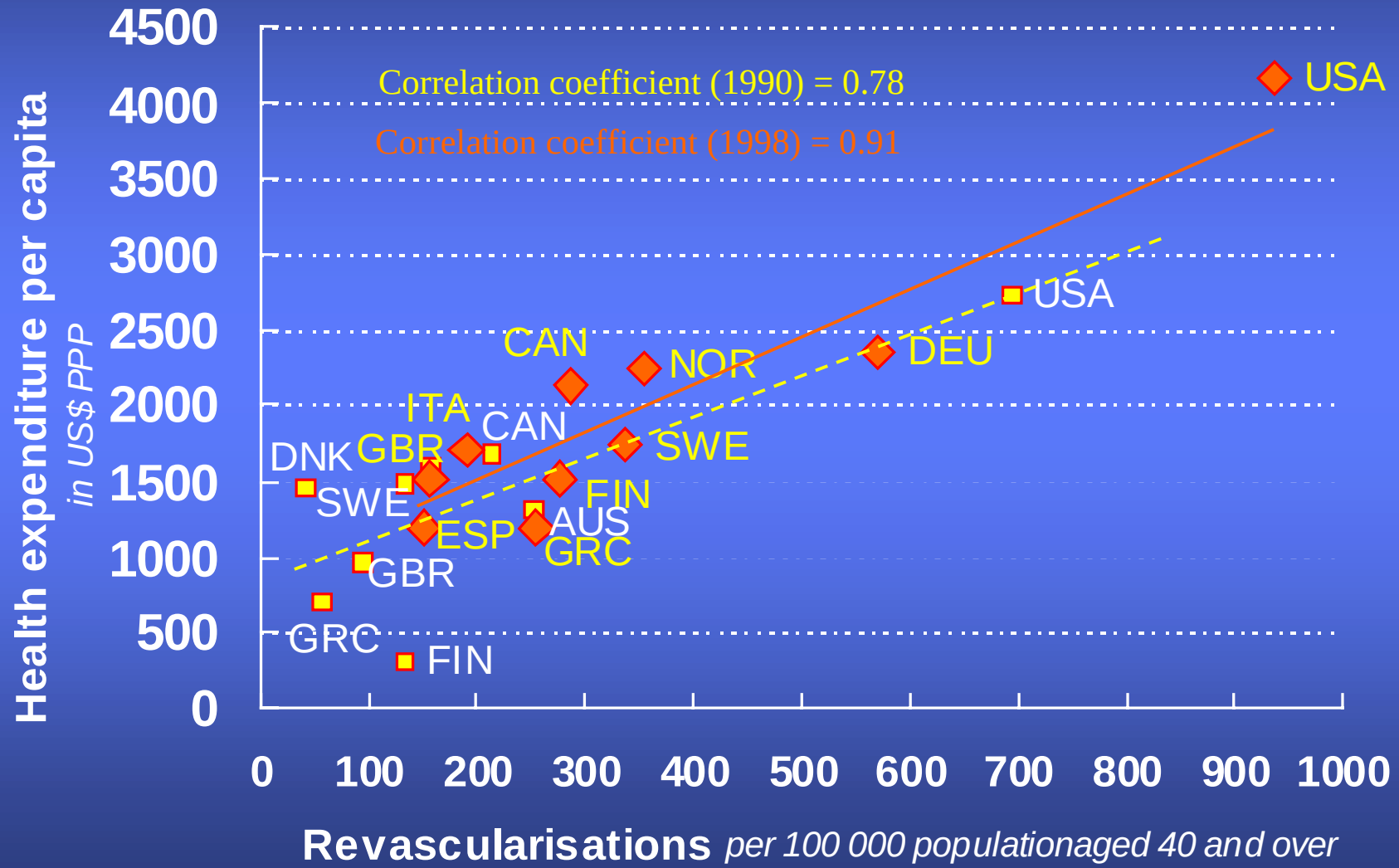
Cardiac surgery facilities and per capita health expenditure



Cardiac catheterisation laboratories and per capita health expenditure



Number of revascularisations and health expenditure per capita



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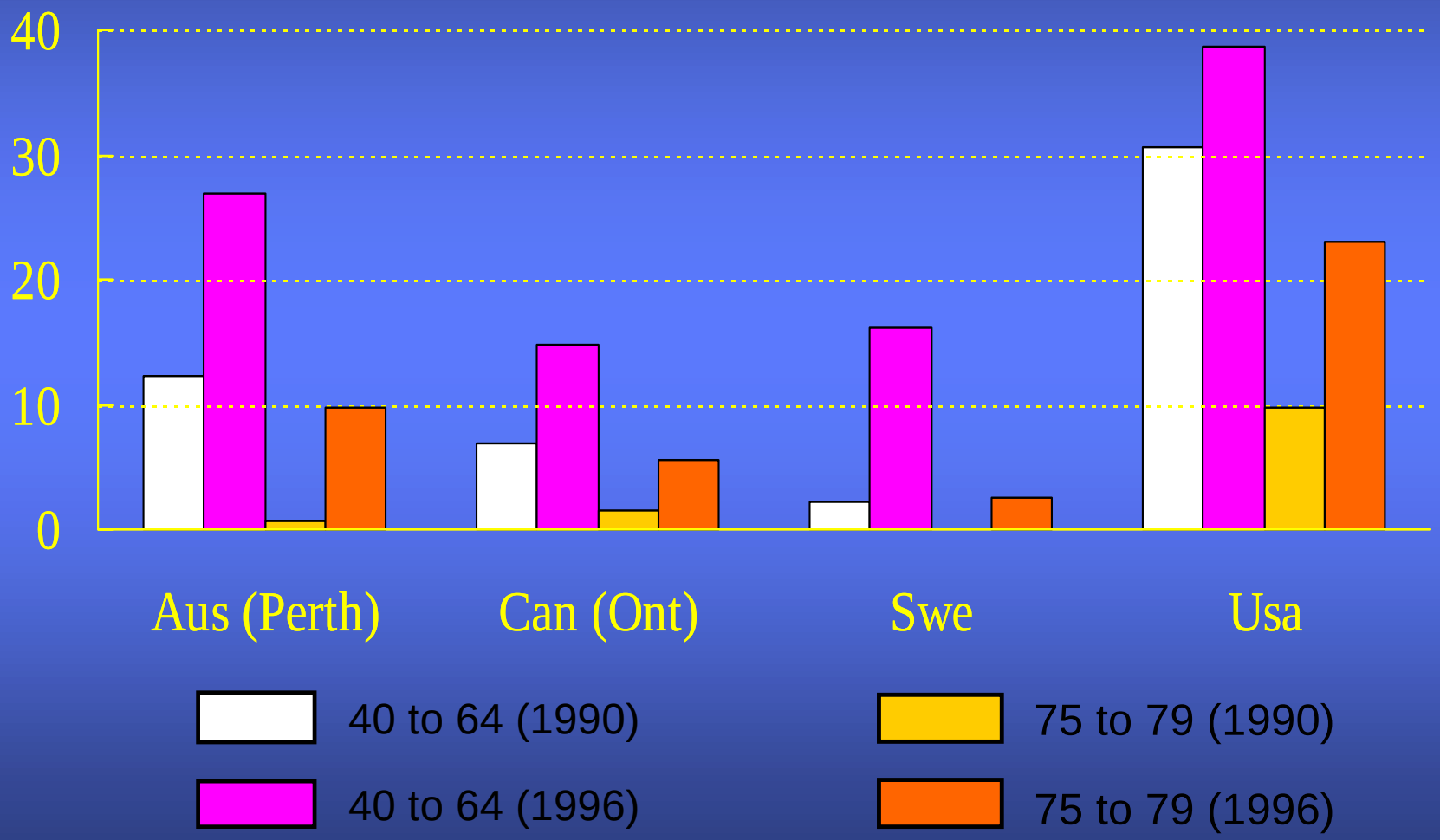
PTCA use during 90-day episode of care (as a percentage of AMI admission, MEN)



Multivariate analysis of the determinants of CABG and PTCA utilisation

Dependent variable:	PTCA		CABG	
GDP per capita	1.695	**	0.095	
	6.53		0.36	
Level of IHD	0.087		1.287	**
	0.59		7.01	
Hospital constraint	0.388	**	0.702	**
	4.92		7.9	
Facility constraint	0.313	**	0.13	*
	4.86		2.05	
Time index variables	> 0	**	> 0	**
No. of observations	85		81	
Percentage of variation explained	87		79	

Should we control technological change in order to control rising health expenditures

- Rationalising the desire for restrained growth in health expenditures with preference for latest technology

- Why the contradiction?
  - Do not accurately measure the benefits and costs

- Measurent problems: Costs
  - Technological change occurs at the disease level
  - Productivity

- Measurement problems: Benefits
  - Health outcomes