International Seminar on Strengthening Public Investment and Managing Fiscal Risks from Public-Private Partnerships

Budapest, Hungary
March 7–8, 2007

ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

KOF
Konjunkturforschungsstelle
Swiss Institute for Business Cycle Research

Public Capital and Economic Growth: Key Issues for Europe

Jan-Egbert Sturm

Budapest, 7 March 2007

Outline presentation

Public capital represents (if not the engine then) the ‘wheels’ of economic activity

- Introduction
- Role of public capital in economic growth
- Development of public capital expenditure
- Empirical findings
  - Three waves of results
- Concluding remarks

Background information

- Sturm, J.-E. (1998), *Public capital expenditure in OECD countries: The causes and impact of the decline in public capital spending*, Cheltenham: Edward Elgar Publishing
- Romp, W. and J. de Haan (2005), “Public capital and economic growth: A critical survey”, *EIB Papers* (10:1), pp. 40-70 (forthcoming in *Perspektiven der Wirtschaftspolitik*)

Theory

Why does public capital matter for economic growth?

- Noticeable absence of formal economic models of the productivity effects of infrastructure
- Normally it is assumed that public capital
  - increases multifactor productivity and/or
  - is a third production factor

Some theoretical issues

- Congestion
  - Congestion gives rise to non-linearities in the relationship between public capital and growth
- Network effects
  - Once the basic links of a network are established, opportunities for productive investment diminishes
- Spill-over effects
  - Not only own stock of infrastructure is relevant, but also the neighbor's stock
- Economies of scale
  - Lower transportation costs might lead to more centralized production and thereby economies of scale

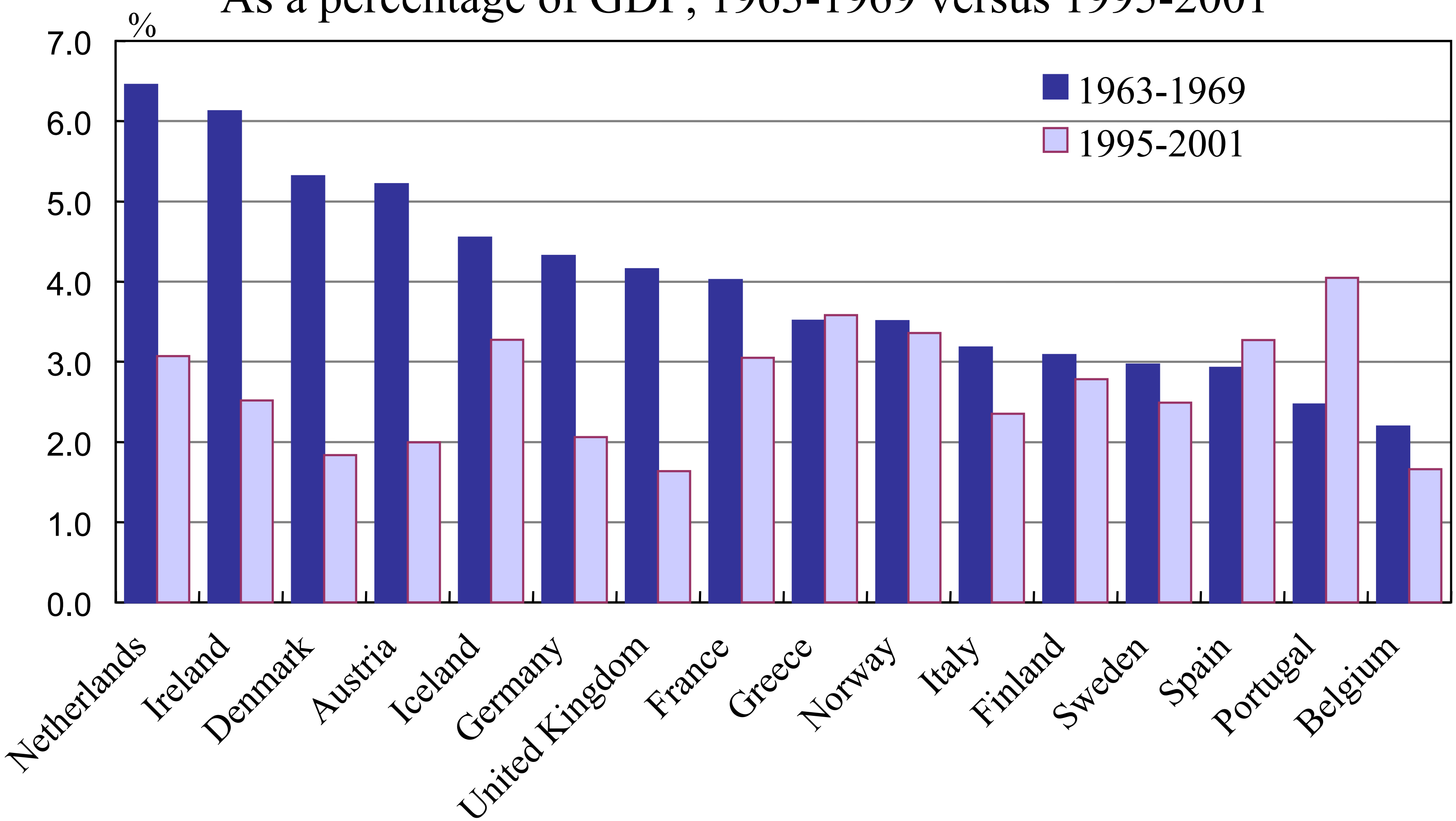
Data

How to measure public capital?

- What is more relevant?
  - Ownership (public / private), or
  - Type of investment (infrastructure / machinery & equipment)
- National Accounts divide by ownership and include non-productive spending items (e.g., swimming pools)
- Stock of public capital equals
  - Sum of past investments adjusted for depreciation
- More relevant are the services provides from the stock
  - Even more difficult to measure

Government fixed capital formation in Europe

As a percentage of GDP, 1963-1969 versus 1995-2001



Source: OECD Analytical Database

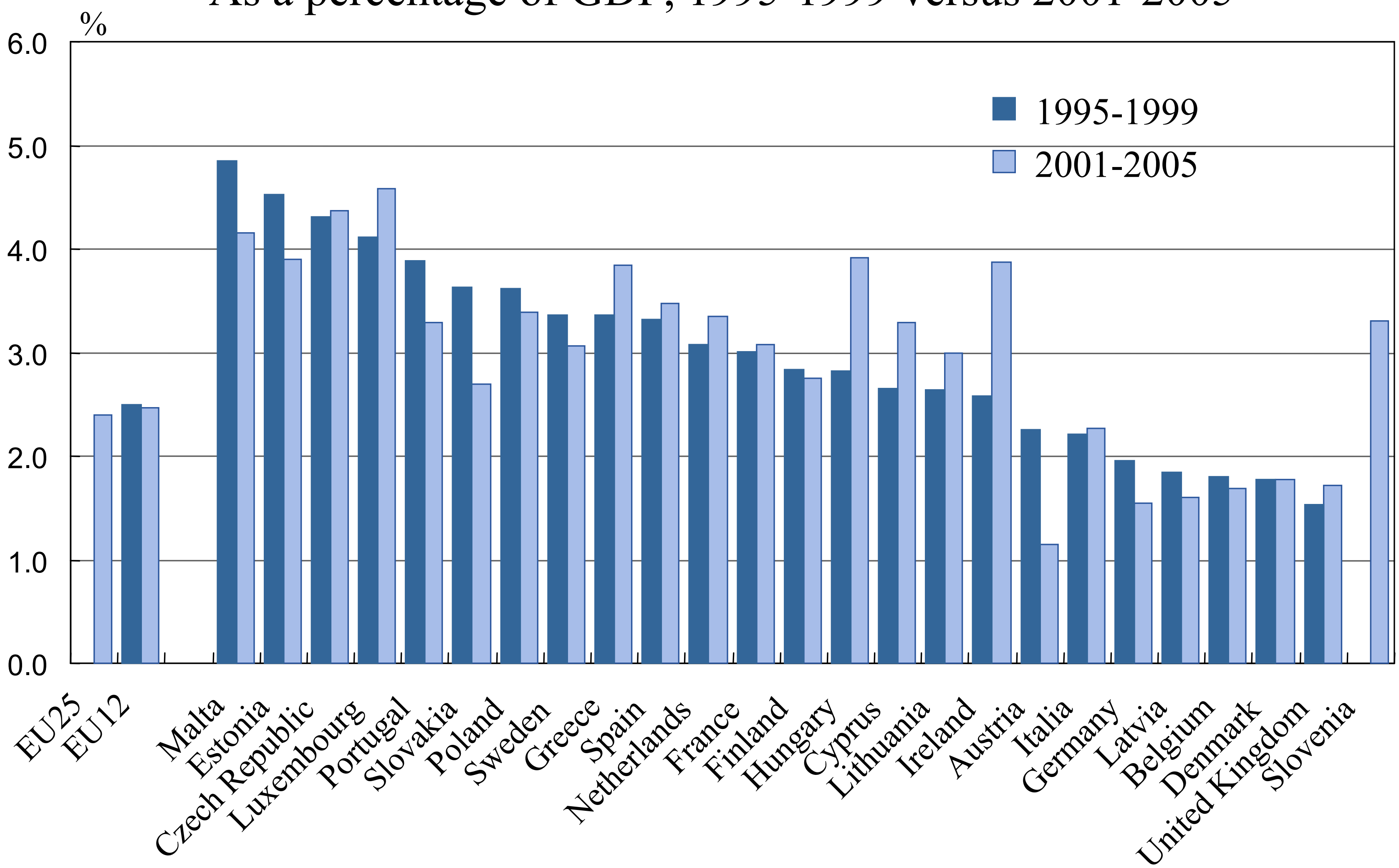
Development of public capital expenditure within the (central) government budget

OECD	Goods & Services	Subsidies & Transfers	**Capital Expenditure**	Interest Payments
1970-79	30.2%	53.2%	**11.9%**	4.8%
1980-89	25.4%	55.4%	**8.6%**	10.5%
1990-01	24.9%	57.4%	**6.8%**	10.9%

Source: OECD Analytical Database

Government gross fixed capital formation in the EU25

As a percentage of GDP, 1995-1999 versus 2001-2005

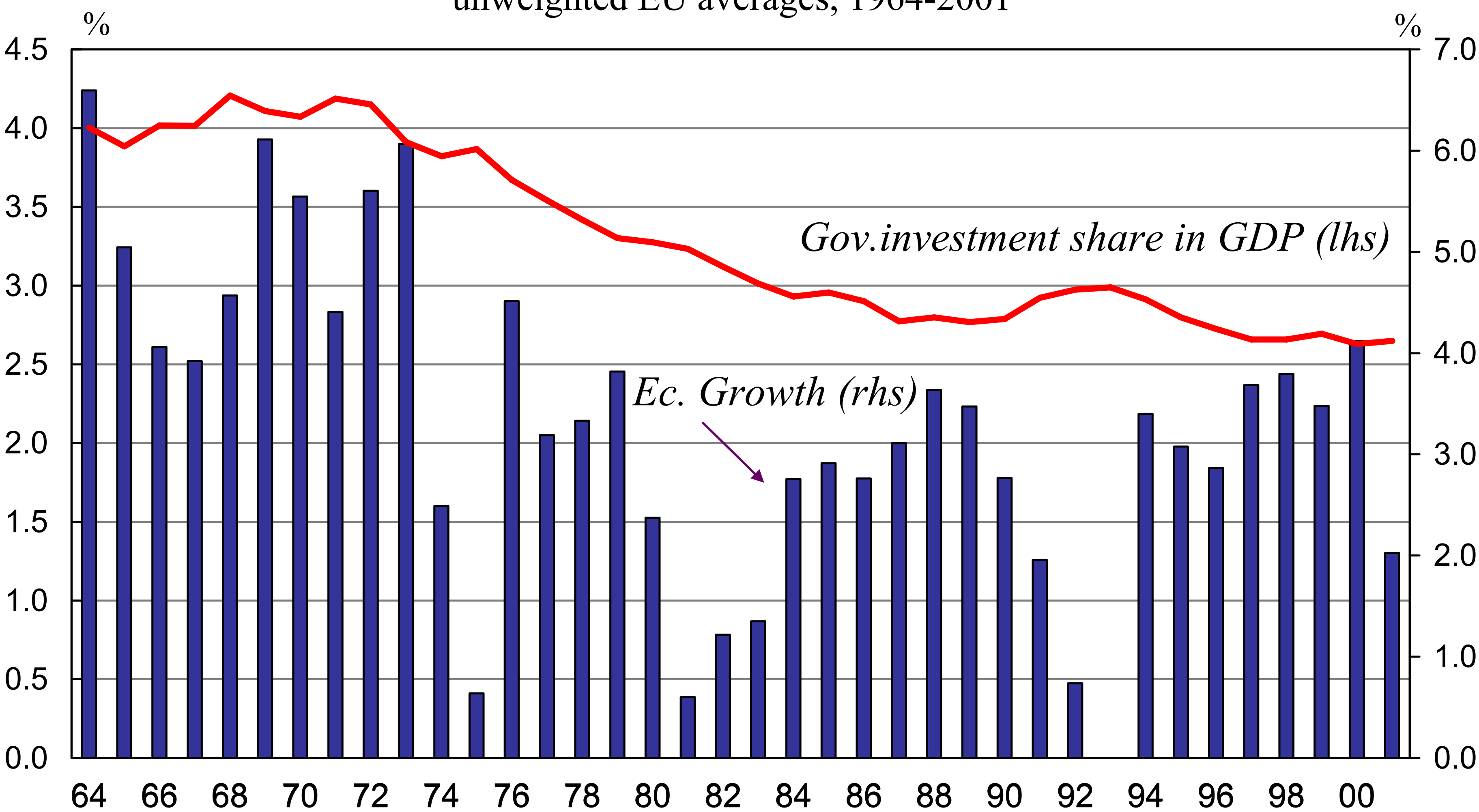


Source: Eurostat.

Empirics

Gov.fixed capital formation share & GDP growth

unweighted EU averages, 1964-2001



Source: OECD Analytical Database, Version June 2002.

How to examine the impact of public capital on growth?

- Four approaches:
  1. Production function approach
  2. Cost function approach
  3. Vector AutoRegression (VAR) models
  4. Cross-country growth models
- Each approach has its merits and own set of problems

Summary empirical results

1. Aschauer (1989) found an output elasticity of public capital equal to 0.4
   - First wave of studies confirmed this result
2. Subsequent studies often did not find a growth-enhancing impact
   - By solving some econometric issues, the relationship turned out to be not robust
3. Now, there is more consensus that public capital furthers growth
   - However, the impact reported in recent studies is substantially less than suggested in the first wave of studies

Relevant question from a policy perspective

- The relevant policy question is:
  "*What is the net effect of more infrastructure taking into account that infrastructure construction diverts resources from other uses*"
  - Most research only focuses on the growth-enhancing effect of public capital
  - What is the optimal level of the public capital stock?
    - Public and private investment are financed out of total savings
    - Public capital should not only be productive, but also productive enough to offset the negative effect of less private investment

Role of maintenance

- Most studies focus on the importance of additional public investment spending
- Maintenance of the existing stock is hardly addressed
- Policymakers have a perverse incentive:
  - new public investment projects are politically more attractive than spending on infrastructure maintenance
- Public capital deterioration is mostly considered as an exogenously given technical relationship
  - Neglecting the choice between investing in 'new' public capital and extending the durability of the existing public capital stock via maintenance

Conclusions

Concluding remarks

- There is now more consensus than in the past that public capital furthers economic growth
- However, the impact reported by recent studies is not as big as some earlier studies suggested
- There is evidence for heterogeneity
  - The effect of public capital on growth differs across countries, regions and sectors
- Network effects cause non-linearities
  - The effect of new public capital depends on the extent to which it alleviates bottlenecks in existing networks

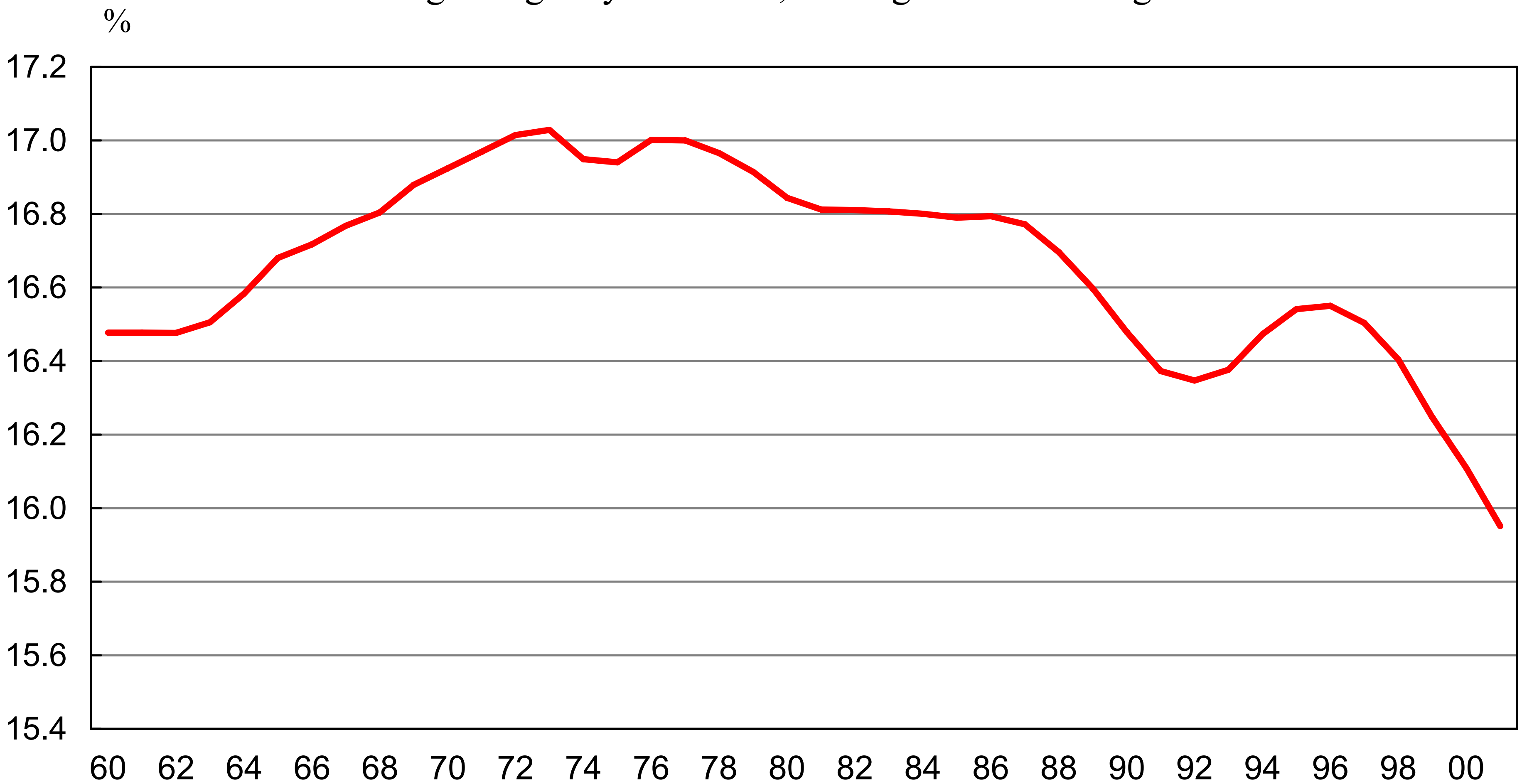
Concluding remarks

- Maintenance and efficient use of existing infrastructure might be more important than building new infrastructure

- Research on explaining the differences in public investment is still in its infancy
- Empirical studies hardly based on theoretical models

Share of gov.net capital stock in total net capital stock

beginning-of-year values, unweighted EU average



Source: Kamps (2004)

Development of public investment

- Since the early 1970s, there has been a decline in public investment in industrialized countries
  - as share of GDP
  - as share of the government budget
- What can explain the drop?
  - Political, demographic, economic reasons?
- During the last decade some shifts within the government budget have been made towards more public investment