

Public Capital and Economic Growth: A Critical Survey

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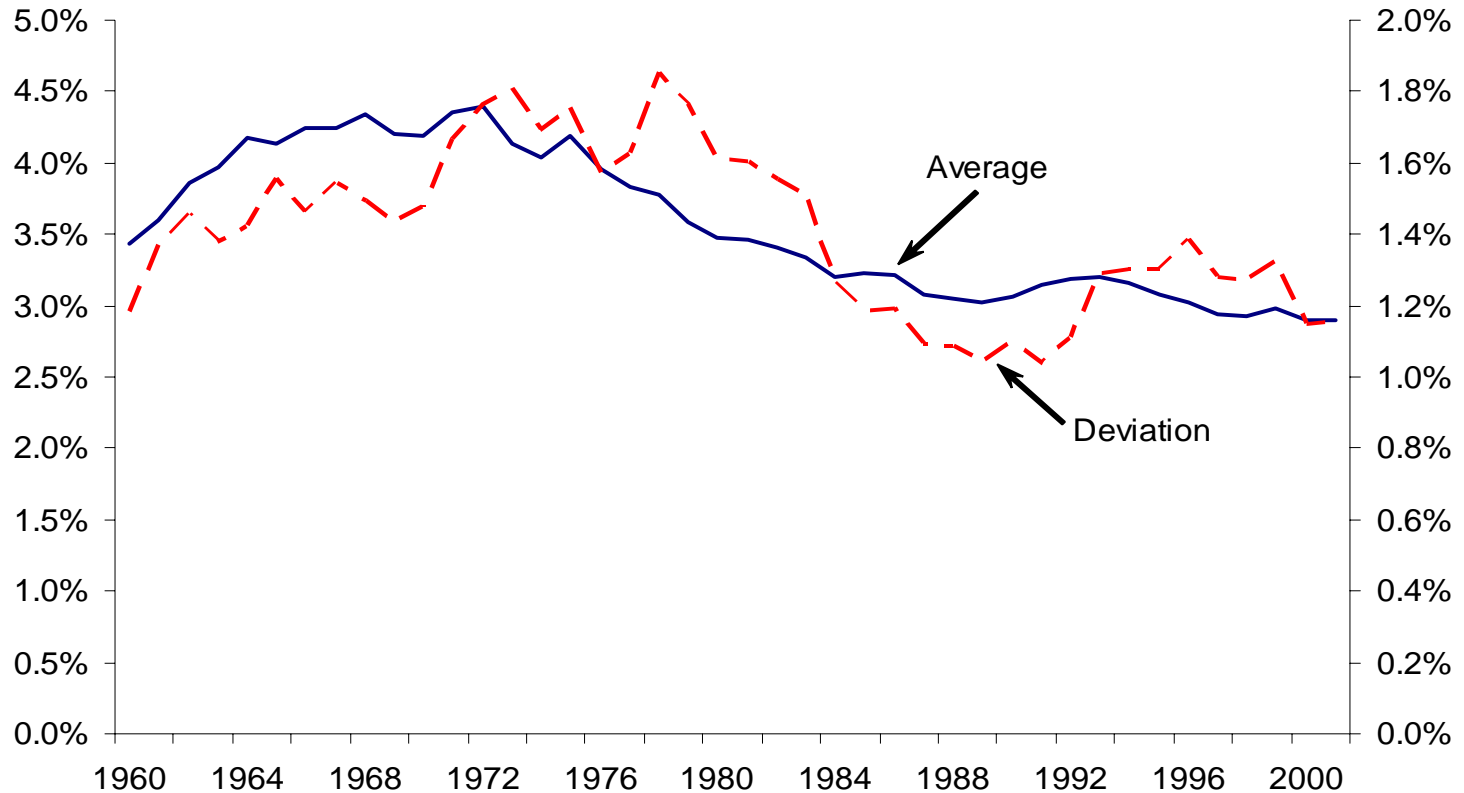


Introduction

- Public capital represents if not the engine then the ‘wheels’ of economic activity. Still, “infrastructure investment is not sufficient on its own to generate sustained increases in economic growth” (World Bank 1994, p. 19)
- Purpose of our paper: review recent literature
- Key question: how important is public capital for economic growth?
- Aschauer (1989) found that a ten per cent increase in the public capital stock would raise multifactor productivity by almost four per cent.



Government investment over the years





Why does public capital matter for economic growth? (1)

- Surprising feature of this literature is the noticeable absence of formal economic models of the productivity effects of infrastructure
- Standard way to incorporate public capital in an economic model is to assume that public capital increases multifactor productivity and/or to introduce public capital as a third production factor in production function
- But...roads as such do not produce anything!!



Why does public capital matter for economic growth? (2)

- Better way is to focus on services provided by public capital (e.g. lower transportation costs)
- Congestion: will give rise to non-linearities in the relationship between public capital and economic growth
- Network effects: Once the basic links of a network are established, opportunities for high productive investment diminishes



Why does public capital matter for economic growth? (3)

- Spill-over effects: Not only own stock of infrastructure is relevant, but also the neighbour's stock
- Economies of scale: Less transportation costs, so possibly more centralized production, which may mean economies of scale



Direction of Causality

- The problem:
 - Public capital may affect productivity and output.
 - Economic growth can increase the demand and supply of public capital services
 - Combination: an upward bias in the estimated returns to public capital if endogeneity is not addressed
- Possible solutions:
 - Test how causality runs
 - Estimate a panel model
 - Estimate a simultaneous equation models
 - Use instrumental variables



Relevant question from policy perspective

- The relevant policy question for infrastructure investment is: “What is the net effect of more infrastructure taking into account that infrastructure construction diverts resources from other uses”
- Unfortunately most research papers do not take this into account and focus on growth enhancing effect of public capital
- Few papers examine whether public capital stock is optimal



How to determine the 'optimal stock of public capital'?

- Compare social marginal benefits with marginal costs, for the optimal stock, these should be equal
- The difficulty is to approximate the marginal costs of capital
 - Cost of borrowing (government bond yield)
 - Use the price of private capital as a proxy
 - Use the opportunity cost. Public and private investment are financed out of total savings. The optimal capital stock maximizes the growth rate, so public capital should not only be productive, but also productive enough to offset the negative effect of less private investment.



Main findings (1)

- Although not all studies find a growth-enhancing effect of public capital, there is more consensus in the recent literature than in the older
- Public capital stimulates growth, but there is also evidence for reverse causality
- The impact found is usually substantially less than found by Aschauer (1989)
- Many studies report that there is heterogeneity: the effect of public capital on growth differs across countries, regions and sectors



Main findings (2)

- Especially network effects cause non-linearities. The effect of new capital will crucially depend on the extent to which investment spending alleviates bottlenecks in the existing network
- Research on the explanation of existing differences in public investment spending is only in its infancy
- Maintenance and efficient use of existing infrastructure might be more important than building more (World Bank, 1994)