In his 1994 paper, “Infrastructure Investment: A Review Essay,” Edward Gramlich offers an overview and critique of the literature on investment in public infrastructure, much of which had been generated during what he termed a “speculative bubble of economic research” in a roughly five-year period prior to the publication of his essay. While his paper is rich with information about a variety of infrastructure investment issues, one of Gramlich’s central ideas is that much of the effort devoted to the subject had focused on the wrong question (essentially, searching for ways to determine if there is or was an infrastructure shortage) and that researchers should focus instead on “what, if any, policies regarding infrastructure investment should be changed.” He bases this argument partially on evidence that existing approaches to evaluating levels of infrastructure capital are each flawed and limited in their potential to generate useful knowledge about the economic contribution of infrastructure, a critique which is well-supported in his article and is one to which I strongly agree. I comment below on the inadequacies of the engineering and economic approaches – as well as the need to reframe the inquiry into infrastructure with an eye to improving policy.

Much of the “speculative bubble” in infrastructure studies arose from the efforts of economists to measure the adequacy of the infrastructure capital stock (and its linkage to productivity), often using econometric techniques and aggregate data on infrastructure stocks or investment. He reviews a number of critiques (which I do not address specifically here) and, in my opinion, rightly concludes that the potential benefit of studying aggregate measures of infrastructure stocks is limited by the low resolution possible through this approach. From a macroeconomic perspective, “infrastructure” is legitimate as a category of capital stock because of the unique economic characteristics shared by various types of infrastructure; however, at a less abstract level, one finds

---

4 Gramlich reviews four general approaches that had been used in attempts to determine if there had been a shortage of investment in infrastructure capital. These four are: engineering needs assessments, political voting outcomes, economic rates of return, and econometric estimates of productivity impact. While he does not wholly reject any of these prima facie, he presents convincing evidence that each of them is flawed or inadequate in some way. I comment on the engineering and macroeconomic approaches in this paper but omit the political voting outcomes and microeconomic methods (rate of return on specific investments) because of space constraints.
that infrastructure is comprised of a variety of systems which deliver similarly varied services to society, and infrastructure systems have complex interrelationships and interdependencies, sometimes with a degree of substitutability but quite often with important elements of complementarity. The details of the infrastructure capital stock (e.g., the specific location of certain systems or the relative stocks of various types of infrastructure) are as important to the adequacy of the services provided by infrastructure as is the overall, aggregate level of infrastructure capital stock.

Using an engineering needs-based approach might enable an analyst to account better for the specifics of infrastructure investments, but Gramlich rightly criticizes these studies as a class for their near-total omission of economic reasoning (relying instead on measuring gaps between existing stocks of infrastructure capital and some specified level determined by “some arbitrary initial period when capital was presumed to be adequate”) and shows, using examples of highway needs studies, that the conclusions reached in such studies seem subjective or unreliable.

Analyzing the total stock of infrastructure and investigating relationships between measurable stocks of infrastructure and their contribution to the economy are valuable activities, but, as suggested above, they are hardly the only aspects of infrastructure capital worth investigating. To understand the contribution of infrastructure investment to the economy – and to answer whether we can make improvements to current investment patterns, and, if so, what those improvements might be – it is necessary to examine infrastructure systems with consideration of the structure of those systems, their location, condition, and performance, and – ultimately – the efficiency and efficacy with which particular infrastructure systems deliver the services they are intended to provide. As Gramlich suggests, it is also necessary to ask how past or existing policies have contributed to infrastructure development and service provision, and how changes in those policies might contribute to infrastructure system improvements and higher economic productivity. His article provides a valuable review of the state of knowledge about infrastructure investment, and his suggestions for reframing inquiry remain timely and applicable to researchers and policy-makers today.

---

5 Gramlich (1994), p. 1181
11.165 / 11.477 Infrastructure in Crisis: Energy and Security Challenges
Fall 2009

For information about citing these materials or our Terms of Use, visit: http://ocw.mit.edu/terms.