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Spillover effects of public capital formation: evidence from the Spanish regions

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Abstract

We investigate the existence of regional spillover effects of public capital in Spain. We estimate VAR models for Spain and its seventeen regions. Estimation results suggest that the aggregate effects of public capital cannot be captured in their entirety by the direct effects for each region from public capital installed in the region itself. When spillover effects are also considered, however, the disaggregated effects are very much in line with the aggregate effects. Ultimately, the aggregate effects are due in almost equal parts to the direct and spillover effects of public capital. This establishes the relevance of spillovers in Spain.

JEL classification: C32; H54; R53

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1. Introduction

The evaluation of the impact of public capital formation on private output has received great attention in the literature. This issue was brought to the limelight by the work of Aschauer [3,4]. Aschauer suggested that public investment would have such large effects that it would pay for itself close to three times in the form of additional tax revenues over the duration of the public capital assets (see Reich [45]). Such large effects induced a flurry of attention to the issue. Subsequent research, however, failed to replicate such large effects. Indeed, it often even failed to find meaningful positive results (see Gramlich [21]

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and Munnell [36] for detailed surveys of the literature and Hulten and Schwab [27] for a detailed presentation on the infrastructure debate).

Aschauer's work has, in particular, inspired a large body of research with a regional focus. Earlier contributions used panel data at the state level to estimate nation-wide production functions for the US. They tend to provide evidence which points to the presence of important effects of public capital formation on private output (see, for example, Duffy-Deno and Eberts [12], Munnell and Cook [37], Eisner [13], McGuire [32], and Garcia-Milà and McGuire [18]). More recent studies, however, find little supporting evidence. Indeed, they suggest that after controlling for the state specific and unobserved characteristics, public capital variables are not significant (see, for example, Holtz-Eakin [25], Evans and Karras [14], and Garcia-Milà et al. [19]). The main conclusion of this literature seems to be, paraphrasing Garcia-Milà et al. [19], that no clear evidence of a positive linkage between public capital and private output has been found at the regional level for the US within the aggregate production function framework.

The inconclusive nature of this literature on the regional effects of public capital is likely due, at least partially, to the fact that it ignores spillover effects (see, for example, Boarnet [6] and Mikelbank and Jackson [33]). Indeed, it could be argued that spillover effects should be an integral part of the analysis of the regional impact of public capital formation (see, for example, Haugwout [22,23]). The positive effects of public capital formation in a region can be induced by public infrastructures installed in the region itself. However, the better accessibility of a region can be generated by greater public capital formation in other regions. This leads us to the concept of spillover effects of public capital formation, i.e., the fact that a region may benefit from public infrastructures installed elsewhere.

Paradoxically, maybe because of the inconclusive nature of the results on the impact of public capital on output at the regional level, the issue of the possible existence of the regional spillovers from public capital formation has received little attention. Munnell [36] deals marginally with this issue. She addresses the fact that the elasticities of output with respect to public capital formation obtained with state-level data tend to be lower compared to those obtained with aggregate data and conjectures that this fact is due to the existence of leakages, i.e., part of the benefits generated from public capital formation are not captured with just state-level data. This issue is addressed directly by Holtz-Eakin [25]. The main finding is that regional level estimates are essentially identical to those from state data, suggesting no quantitatively important spillover effects across states. In turn, Holtz-Eakin and Schwartz [26], focus on the case of state highway investment. Again, no evidence of quantitatively important regional spillovers is found. Clearly, the empirical relevance of regional spillovers of public capital is an unresolved issue in the case of the US. Furthermore, little evidence is available for other countries. This is due to the very basic reason that public capital data, in particular at the regional level, is typically not available for other countries.

This paper is in the confluence of the empirical literature on the regional effects of public capital formation and the empirical literature on the relevance of regional spillovers. Indeed, the objective of this paper is to investigate, in a methodologically consistent manner, the regional effects of public capital formation and the possible existence of regional spillover effects in Spain. The Spanish case is very interesting. First, the Spanish