

Dam Spillovers: Direct costs and spillovers from environmental constraints on hydroelectric generation*

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Abstract

Water policy, and particularly, its interaction with energy supply and demand are at the forefront of currently policy analysis. This paper contributes to that discussion by estimating the direct costs from a set of environmental regulations on hydroelectric dams and the resulting indirect costs to unregulated fossil fuel generators participating in the same output market using micro-level data and accounting for firm-level heterogeneity. Using a novel method of imputing hour-to-hour operations at hydroelectric dams, I find large direct effects, reducing the mean value of output between 10.6 and 18.0%. However, substantial spillovers to other firms comprise over 50% of the total estimated cost of the regulations. Difference-in-difference estimates typical in the literature are likely to vastly understate direct costs and spillovers. Decomposition of these effects suggests spillovers are driven by water scarcity in dry years and complementarity between disparate generation technologies in wetter years. These effects will continue to grow as climate change increases water scarcity and the deployment of renewable generation technologies increases.

JEL: L51, Q25, Q51, Q52, Q53

Keywords: Regulation, Spillovers, Electricity, Environment

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