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SURVEY

Technological change in economic models of environmental policy: a survey

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Abstract

This paper provides an overview of the treatment of technological change (TC) in economic models of environmental policy. Numerous economic modeling studies have confirmed the sensitivity of mid- and long-run climate change mitigation cost and benefit projections to assumptions about technology costs. In general, technical progress is considered to be a non-economic, exogenous variable in global climate change modeling. However, there is overwhelming evidence that TC is not an exogenous variable but to an important degree endogenous, induced by needs and pressures. Hence, some energyâ€“economyâ€“environment models treat TC as endogenous, responding to socio-economic variables. Three main elements in models of technological innovation are: (i) corporate investment in research and development (R&D), (ii) spillovers from R&D, and (iii) technology learning, especially learning-by-doing.

The incorporation of induced TC in different types of energyâ€“environmentalâ€“economic models tends to reduce the costs of environmental policy, accelerates abatement and may lead to positive spillover and negative leakage.

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Keywords

Exogenous technological change; Induced technological change; Energyâ€“economyâ€“environment models

Induced innovation, evolutionary theory and path dependence: sources of technical change, pulsar's proven.
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