

On Subsidizing the Adoption of Energy-Saving Technologies When Technological Change is Uncertain

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Firms do not always purchase the state-of-the art technology (in terms of energy efficiency). This phenomenon has been labeled the (energy-) efficiency paradox. A potential explanation that we will explore in this paper is that the technological performance of the latest technologies is uncertain. Given that investments are often (to a large extent) irreversible, the uncertainty may explain (i) the postponement of the investment decision in general and (ii) the fact that (at least some) firms invest in 'older' proven technologies.

In our analysis we assume that the performance of new technologies is not known in advance, and that the uncertainty is resolved only through time. The relevance of such uncertainty for investment behavior and the resulting degree of energy saving is assessed in a putty-clay model of investment. The putty-clay model of investment offers a natural way to account for irreversibility simply because after the investment decision is taken the characteristics of the installed capital goods, defined in terms of factor intensities (the chosen technology), remain fixed during the equipment's lifetime. We argue that in such a model, a case can be made for subsidies; when subsidies result in additional adoption of technologies, they contribute to the resolution of technological uncertainty and may thereby fasten the adoption of energy efficient technologies and avoid (temporary) lock-ins in relatively energy-inefficient technologies. Allowing for endogenous depreciation of old technologies, the paper finally assesses the quantitative impact of technological uncertainty on the dynamics of capital accumulation in several sectors in the Dutch economy.

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