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Energy Policy, Food, and Climate Change - A Numerical Simulation Approach

Thomas Kuhn, Michael Pickhardt & Frauke Voosholz, University of Münster, Germany

ABSTRACT

Growth orientated policy schemes as well as future energy policy must be, to a large extent, concerned with transportation fuel issues. In particular, sustainable growth rates require, among other things, a substantial substitution process, in which biofuels, hydrogen, or environmentally friendly generated electricity substitute for fossil fuels continuously. In this paper we model this substitution process by incorporating both, a non-renewable resource and a renewable resource, which can both serve for producing transport fuels, into a conventional Romer-type endogenous growth model. Moreover, as a prominent feature of the modeling we also capture the fact that biofuels production may compete with food production for arable land. The main results of the paper, the Keynes-Ramsey rule, the modified Hotelling rules for the renewable and non-renewable resource, and the fuel versus food trade-off are discussed in some detail. Numerical simulations of the model are illustrating the main results.