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A Search for an Operational Environmental Policy Based on a Model of Sustainable Development

A basal macroeconomic model of produced capital accumulation and cyclical growth with endogenous technological progress contains non-linear differential equations. It generates long waves in a closed capitalist economy not constrained by natural resources via the Andronov - Hopf bifurcation. Extended models reflect the impact of economic activities upon natural environmental conditions. These conditions, in their turn, influence the growth rates of labour productivity and capital intensity. Policies, based on a perception of resource scarcity and pollution levels, are also included in this model. These extensions respond effectively to the two major drawbacks of conventional growth models: the neglect of new scarcities of natural resources and the neglect of degradation of environmental quality.

The extended models of eco-capitalism (Oekokapitalismus) show, first, that new technologies increase the production capacity to extract natural resources and to produce more goods and services, thus increasing the production per capita that leads to additional environmental degradation and depletion of non-renewable resources. Second, these models display how new investment enhance developed natural assets. Operational policies are elaborated within the scope of the existing and potentially feasible regulatory institutions for achieving sustainable development.

It is shown that a capitalist economy that cares more about the environment grows faster and has a higher average ratio of employment than an economy that cares less. The relative wage is also greater, on the average, than that in the initial model of long waves if the coefficient of eco-efficiency and other model parameters satisfy the condition specified. The world development indicators provided by the United Nations, OECD, EU, national statistical offices and by other organisations comprise an empirical base of this research.