Intertemporal Equity and Efficient Allocation of Resources

Tapan Mitra

ABSTRACT

The purpose of this paper is to characterize competitive paths which are both efficient and equitable, in a general continuous-time model of accumulation involving heterogenous capital goods. Specifically, the paper explores the significance, for such a characterization, of the investment rule proposed by Hartwick, which states that the valuation of net investment (including the dis-investment in the stocks of non-renewable resources) be zero at each date. It is known that Hartwick's rule is sufficient for intertemporal equity of competitive paths. However, it is not necessary for competitive equity. In fact, from the result of Dixit, Hammond and Hoel, we know that competitive equity is *characterized* by the condition that the valuation of net investment is *constant* over time.

We show, in this paper that competitive paths which are efficient must satisfy a "terminal cost minimization condition", thereby providing a continuous-time counterpart to a well-known discrete-time result, due to Malinvaud. Using this result, competitive paths which are equitable *and* efficient are shown to satisfy Hartwick's rule, which turns out to be simply the necessary first-order condition of terminal cost minimization along competitive equitable paths. Given our results, Hartwick's rule takes on a significance that is quite distinct from the intertemporal equity issue. In fact, its role is seen to be to help identify *inefficient* equitable paths.