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ECONOMIC GROWTH AND POPULATION DYNAMICS: A DISCRETE TIME ANALYSIS

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Abstract. This paper reformulates and generalizes the classical Uzawa-Lucas model of economic growth and human capital accumulation by representing time as a discrete variable and using a population law with non-constant growth rate. In addition, the model is developed by using a more general utility function than the original. In this setup, the model can be represented by a four-dimensional dynamical system, which admits a unique optimal trajectory in human and physical capital and consumption. It is shown that there is a unique non-trivial equilibrium. The results of the study are compared with the original model in discrete time.

Keywords. Uzawa-Lucas model; economic dynamics; human capital; economic growth; discrete time.

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1 Introduction

Economic growth theory is founded on the neoclassical model, originally introduced by (55), (62), (63), (22), and (40). With a relative simple framework, this model can replicate the most relevant stylized facts on economic growth pointed out originally by (39) and revisited by (37). Possibly the strongest supposition of this first generation of growth models is that growth occurs only through the accumulation of physical capital. Beyond the correct of this supposed sixty years ago because the central role of accumulation itself, today other endogenous features like ideas, institutions, population, and human capital are the center of growth theory (37).