Growth with unintended bequests

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Abstract

In an overlapping generations model with finite lifetimes sustained growth is possible if there is a positive risk of death. A redistribution occurs when non-altruistic parents leave unintended bequests to their children. © 2000 Elsevier Science S.A. All rights reserved.

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1. Introduction

This paper studies the effect of unintended bequests on economic growth. Jones and Manuelli (1992) show that in one sector overlapping generations models with convex technologies the asymptotic growth rate must be zero, as the young generation does not have sufficient income to acquire a sufficiently large stock of capital from the old generation. They suggest several modifications of the model that will imply endogenous growth. The first is the existence of intergenerational linkages as in Barro (1974). The second is a redistribution of income through taxes. Finally they consider two sector models and models with nonconvex technologies. Recently, Araujo and Martins (1999) pointed out that sustained long run growth is possible with the introduction of an absolute bequests motive. In other words altruism is not the unique method of introducing a bequest motive.

Another type of bequest, which is considered in this paper, is the unintended bequest. In Jones and Manuelli (1992) growth is attained at the expense of lower present consumption. There are individuals (the old) who pay the cost of growing but do not live enough to enjoy its benefits. By introducing uncertainty of life we show that growth is Pareto optimal.

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Section 2 describes the model and Section 3 contains some concluding remarks.

2. The model

Time is discrete and indexed by \( t = 0, \ldots, \infty \). There is a constant population of agents belonging to overlapping generations with finite but uncertain lifetimes. Each agent matures safely through the first period of life and has a probability of surviving for a second period. There is only one good in the economy. Following Araujo and Martins (1999), in the first period of life, an agent receives a bequest which is partly consumed and partly saved for next period’s production. A simple AK production function determines the endowment of an agent in the last period of her life or the amount of her unintended bequest should she die at the end of period one. All agents have identical preferences and are aware of their life expectancies.

The expected lifetime utility of an agent born at time \( t \), \( U^t \), is given by

\[
U^t = \log(c^t_y) + \pi \log(c^t_o); \quad \theta, \pi \in (0,1)
\]

where \( c^t_y \) and \( c^t_o \) denote consumption when young and old, respectively, and \( \pi \) is the probability of surviving to the second period. To make the analysis more tractable we assume that consumption is substituted intertemporally with unit elasticity. An agent is faced with the problem of maximising Eq. (1) subject to the budget constraints for the first and the second period:

\[
c^t_y + k^t = (1 - \pi)c^t_o^{-1}
\]

\[
c^t_o = Ak^t.
\]

From the first order conditions we obtain:

\[
\frac{c^t_o}{c^{t-1}_o} = \frac{A\theta \pi(1 - \pi)}{1 + \theta \pi}.
\]

From this equation we can derive the rate of growth in this simple economy:

\[
g = \frac{k^t - k^{t-1}}{k^{t-1}} = \frac{A\theta \pi(1 - \pi)}{1 + \theta \pi} - 1.
\]

The rate of growth depends on technology \( A \), preferences \( \theta \) and the survival probability \( \pi \). Lifetime uncertainty is a necessary condition for growth in this model which is positive if and only if:

\[
\frac{\theta(A - 1) + \sqrt{\theta^2(A - 1)^2 - 4A\theta}}{2A\theta} < \pi < \frac{\theta(A - 1) - \sqrt{\theta^2(A - 1)^2 - 4A\theta}}{2A\theta}.
\]

Also, growth is maximised if \( \pi = (\sqrt{1 + \theta} - 1)/\theta \) which is a decreasing function of \( \theta \). Thus a higher life expectancy is required to keep growth unchanged when agents are less patient.
3. Conclusion

This paper uses a simple model to demonstrate that endogenous growth is possible in a one sector OLG framework with a convex technology if the time of death is not known. Jones and Manuelli (1992) show that a no growth result does not apply when the realistic assumption of uncertain lifetime is included in the analysis.

References