ELSEVIER

Economic Modelling 20 (2003) 1053–1081

Economic Modelling

www.elsevier.com/locate/econbase

# Accumulation and distribution of human capital: the interaction between individual and aggregate variables

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**Abstract**

The paper analyses the joint evolution of accumulation and distribution of human capital in an OLG framework. Dynamics arises from the interplay between human capital distribution and individual variables—inherited human capital and inborn ability. Such interaction drives individual investment in human capital and accumulation in the economy. According to initial distribution the model provides different dynamical behaviours linking growth and inequality; in general economies with a more equal initial distribution grow faster but other cases are possible. Moreover, since the model provides an endogenous threshold for investing in human capital, the distribution is characterised by multi-modality.


*JEL classifications:* D31; D82; I20; J41; O41

*Keywords:* Human capital; Accumulation; Bargaining; Inequality; Poverty trap

## 1. Introduction

The relationship between the endogenous accumulation of human capital and the effects on the distribution of earnings, income or wealth has been the main focus of a large part of research over the last decade. In some cases the accumulation process drives the dynamics of personal distribution, as in the standard neoclassical model with hetereogenous agents. In some others the nexus is exactly reversed, as

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PII: S0264-9993(02)00064-0

in the *Political Approach*, where the relative distance between median and mean incomes decides the amount of taxation in the economy which, in turn, affects the accumulation process of physical and human capital in rational agents.

In any case, it is hard to think that the causative nexus between growth and distribution is a 'one-way' relationship but rather a feedback rule. As stressed by Galor and Tsiddon (1997), Benabou (1996), Durlauf (1996) and Gradstein and Justman (1997), feedback can arise in the accumulation of human capital from social and parental background and local variables, such as local taxation, school quality or the enforcement of property rights. These 'neighbourhood' effects involve a powerful feedback between individual behaviour and economic performance: socio-economic variables affect individual behaviour which in turn modify the socio-economic context in a circular way. As a result of this continuous interplay between the individual and the economy the common dynamics of growth and distribution arises.

The common thread of this literature is the persistence of inequality over time and the dependence on the initial distribution of income or human capital; in the long run, the personal distribution of income or human capital tends to be polarised around two or more modal points and in general the convergence process towards these points follows a 'club convergence'. Empirical support to the thesis comes from Quah (1996a,b, 1997) and Durlauf and Johnson (1995) among others. The latter identify four different regimes in which subgroups of countries defined by initial conditions obey separate linear models[1] while the former finds a bimodality in the transition distribution across countries which means that countries grow along two separate dynamical paths with low probability for a country to switch from one path to the other. More recently, Milanovic and Yitzhaki (2001), have decomposed total income inequality in the world into three groups: the rich G7, the less developed countries and the middle-income countries; they found that the middle-group is very thin and that there is very little overlap between rich and poor countries. In other words they find further evidence of a bimodal distribution of income over the world.

This work sets out further insights into the interplay between individual accumulation of human capital and the distributive curve by means of a theoretical model. Unlike current literature, we model the feedback mechanism linking individual and aggregate variables via the labour market: individuals invest in human capital by comparing discounted expected income earned by working as an unskilled worker after compulsory school and expected income obtained by being employed as a skilled worker, after having invested further resources in schooling. This choice depends on inherited human capital, schooling cost, genetic ability, and expected unskilled wage, related to the probability of being employed as unskilled, which in turn depends on the conditions of the labour market related to human capital distribution characteristics. Unemployment among unskilled individuals is possible because of an imperfect labour market characterised by bargaining; it is worth

[1] Durlauf and Johnson (1995), p. 378.