Age structure and income distribution policy*

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Abstract. The dependence of earnings on age is a firmly established empirical fact. A simple microeconomic model of educational choice, being consistent with this observation, is designed. The model lends itself readily to aggregation over individuals and age groups. Thus, relations can be set up between economic variables influencing the aggregate distribution of labour incomes and demographic variables determining the age structure of the population. The main results of the present study are the following two:

- Overall earnings inequality is shown to be an increasing function of life expectancy and a decreasing function of fertility.
- The effectiveness of redistributive policies is sensitive to the age composition. In particular, the inequality-reducing effect of a one percent income tax rise is shown to be the smaller the older the population.

I. Motivation

The statistical dependence of earnings on age is firmly established. There even seems to be no doubt about the concave shape of what has become known as the "age-earnings profile" (see, e.g., Lillard 1977; Creedy and Hart 1979; Klevmarken 1982; Baudelot 1983). A direct implication of this relationship is that the personal distribution of labour incomes within an economy depends on the relative numbers of individuals of different ages, that is on the age structure of the population. Though many empirical studies have been concerned with this issue, especially trying to quantify the 'age-effect' on the distribution,¹ the

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¹ This literature originated from Paglin (1975). A useful clarification of a number of controversial points encountered in that literature is provided by Mookherjee and Shorrocks (1982).
theoretical consequences particularly as to policy have not yet been worked out in any satisfactory way.

The need for theoretical insights into the relation between the economic variable "labour income" and the demographic variable "age" from a practical policy viewpoint seems obvious. The demographic factors determining age and its distribution within a population have been subject to considerable changes over time, not only due to epidemics and wars but also due to medical advance and to changes in attitudes towards children or, more generally, towards life. Given the above mentioned dependence, these demographic breaks and developments must have a distinct effect on the distribution of earnings, and any rational policy intending to influence economic inequality thus needs to know at least its nature and direction.

The present paper tries to identify the kind of questions which might arise in this context by devising a theoretical model which is capable of capturing certain crucial aspects of the interrelation between age structure differentials, earnings inequality, and distribution policy, thereby not only pointing to a neglected direction for future research but also envisaging the classic topic of income distribution as part of the newly evolving field of population economics.

II. Introduction and results

A statistical correlation as such is not very telling. From an economic perspective the cited empirical evidence remains descriptive or even meaningless, unless it can be cast in a consistent theoretical model. To approach this goal, the demographic variable age has to be given an economic interpretation. In the present case this is done by linking age to the notion of economic productivity, following the conception of the theory of human capital.

Selecting this theory, of course, means accepting all advantages and disadvantages of the human capital approach. Many articles have been written on its pros and cons and I shall not go into details here (see, e.g., Thuro 1970; Blaug 1976; Sahota 1978; Mincer 1979). For the purpose at hand the human capital theory seems more suitable and more natural than other theoretical designs, especially on account of its applicability to a structural analysis of distributional issues. Nevertheless, other theoretical life-cycle foundations could have equally been chosen a priori.

In short, the logic of the model is as follows. Given the standard presumptions of human capital theory, each individual is postulated to act as if he has the objective of optimally allocating his disposable resources over his life cycle in order to maximize the present value of his earnings. The resulting optimal path of human capital investments generates a concave age-earnings profile, which is consistent with existing empirical evidence. The structure of the basic micro-economic model is such that it lends itself readily to aggregation over individuals and age groups. In this way, explicit relations can be established between economic variables influencing the overall distribution of labour incomes and demographic variables determining the age composition of the population.