Intergenerational human capital evolution, local public good preferences, and stratification

Been-Lon Chen [a], Shin-Kun Peng [a,b], Ping Wang [c,d,*]

[a] *Academia Sinica, Taiwan, ROC*
[b] *National Taiwan University, Taiwan, ROC*
[c] *Department of Economics, Washington University, St. Louis, MO 63130-4899, USA*
[d] *National Bureau of Economic Research, Cambridge, MA 02138, USA*

A R T I C L E I N F O

A B S T R A C T

This paper considers heterogeneities in preferences over the local public good, human capital formation, and residential locations as primary underlying forces of economic stratification in an endogenously growing economy. We construct a two-period overlapping-generations model with two regions and various forms of human capital externalities where altruistic agents determine intertemporal allocation of time, investment in a child's education and residential location. We fully characterize a balanced growth equilibrium with no migration across generations to elaborate on how changes in preference, human capital accumulation, production, and interregional commuting parameters may affect the equilibrium stratification outcome in the long run.

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1. Introduction

It has been recently documented that despite a decline in racial segregation, economic stratification in the U.S. has risen sharply over the past three decades (Jargowsky, 1996). This trend has led to various adverse socioeconomic consequences, particularly low intergenerational mobility of urban ghetto residents (Wilson, 1987). What are the underlying determinants causing economic stratification in the process of economic development? This paper attempts to address this important issue using a human capital-based endogenous growth model within the dynamic general equilibrium framework.

The study of dynamic process of economic stratification is still at its childhood stage. In his pivotal work, Benabou (1996a) constructs an overlapping-generations model in which strong complementarity between individual human capital and a local human capital aggregator encourages economic segregation whereas strong complementarity between individual human capital and a global human capital aggregator discourages it. Specifically, the local human capital aggregator is driven primarily by region-specific incomes and income taxes; the global human capital aggregator is in forms of economy-wide human capital spillovers *à la* Romer (1986) and Lucas (1988).[1]

Our paper extends Benabou (1996a) in three significant aspects. First, we consider three types of human capital spillovers that may be crucial for endogenous sorting: intergenerational spillovers, peer group externalities in schooling

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[1] In a companion paper, Benabou (1996b) illustrates that lack of access to capital markets can reinforce human capital-induced economic segregation.

and peer group externalities in production. Second, we endogenize *both* parents' investment decision in children's education and students' education effort and allow these decisions to interact with each other. This interaction is crucial because the former will interact with peer group externalities in schooling, while the latter will only interact with peer group externalities in production via education-work trade-off. Both decisions will in turn affect the equilibrium sorting outcome. Third, we include heterogeneous preferences for the local public good (LPG) service as a source of economic segregation.[2] This inclusion is interesting because preferences for the LPG and human capital factors may reinforce each other, jointly influencing the likelihood of economic stratification in the long run.

Specifically, we construct a two-period overlapping-generations economy with two regions where altruistic agents differ *ex ante* in their preferences over the LPG, inherited human capitals, and initial residential locations. In addition to inherited human capital and parental investment in her education, a young agent may enhance her human capital by devoting greater effort to schooling, though it is at the expenses of reducing her work effort. An old agent allocates her after-tax income to consumption, investment in her child's education and commuting. The LPG facility is financed solely by local income taxes and established in one of the two regions; those who reside in another region must incur an interregional commuting cost in order to enjoy the LPG service. Thus, an agent optimizes to determine her consumption, educational choice, investment in her child's education, and her residential location when old. We will characterize a balanced growth equilibrium along which there is no migration across generations and consumption, human capital and output are all growing at constant rates.

We find that heterogeneous preferences for the LPG are important sources of economic stratification along a balanced growth path (BGP). Provided that LPG preferences are heterogeneous, the balanced growth equilibrium is completely integrated if the local income tax rate differential is sufficiently small or sufficiently large. When the tax rate differential takes intermediate values, agents are completely stratified where those with higher preference bias toward the LPG reside in the region containing the public facility. With weak parental altruism or intergenerational human capital spillovers, economic stratification is more likely to remain in the long run and intergenerational mobility is low. Similar results arise when the individual schooling effort effect in human capital accumulation is less essential and the schooling peer group effect in production is less important. Additionally, when interregional commuting is more costly, economic stratification is more likely to be sustained.

2. The model

Consider a two-period overlapping-generations economy with two goods, a composite consumption good, denoted by c, and an LPG, denoted by G. The LPG can be viewed as publicly provided local parks, museums, concert halls, or theaters. There are two regions, labelled by $\ell = A, B$. The LPG is in region A. There is a continuum of agents of mass one in each generation $t = 0, 1, \ldots$, where a continuum of initial old agents is populated in period 0. Agents are heterogenous only in their relative preferences away from the composite good towards the LPG, denoted by $\gamma = \gamma^H, \gamma^L$, where $\gamma^H > \gamma^L$. To ease the notation, let us use superscript to index generation/type/location, subscript to index time, and argument (i) to index family.

Agents when young undertake education, accumulating human capital to enhance their production when old. Without loss of generality, we assume that agents only consume when old. Each agent is endowed with one unit of time during the entire lifetime, which can be used for schooling when young (s) or for production when old $(1 - s)$. To avoid unnecessary complexity from counting populations, the reader may imagine that each family has a single parent who gives birth to one child during her entire lifetime. Due to altruism, an agent when old (a parent) cares about her descendants: she looks after her single child's welfare both directly, via her investment effort devoted to her child's education (v), and indirectly, via intergenerational human capital spillovers and her own locational choices that affect the within-the-cohort human spillovers.

Consider a representative agent $a^t \equiv a^t(\gamma, h_t^{t-1}(i^{t-1}), z_t^{t-1}(i^{t-1}))$ of generation-t born in a family headed by i^{t-1}, whose inherited human capital from the parent is $h_t^{t-1}(i^{t-1})$ and whose residence pre-determined by the parent is $z_t^{t-1}(i^{t-1})$. While i^{t-1} represents the parent of agent a^t, we label the descendant of a^t by j^{t+1}. Thus, (i^{t-1}, a^t, j^{t+1}) summarizes the entire direct family tree of a^t. The lifetime utility of a representative agent a^t is given by

$$U_t(a^t) = c_{t+1}^t + \gamma(\zeta + \ln G_{t+1}) + \alpha h_{t+1}^{t+1}(j^{t+1}) \tag{1}$$

where $\zeta > 0$ is introduced to ensure normal locational choice outcome[3] and $\alpha \in (0, 1)$ is the intergenerational discounting factor. In the case where $\alpha = 0$, this utility functional form reduces to that in Berliant et al. (2006), which modifies the separable quasi-linear utility function originally proposed by Bergstrom and Cornes (1983).[4] Our setup extends the functional form used in the literature by considering *intergenerational altruism* (IA). With regard to IA, one may use the dynasty setup putting the descendant's utility into the parent's utility. However, for analytical simplicity, we follow Glomm and Ravikumar (1992), assuming instead that the parent only cares about the descendant's human capital (h_{t+1}^{t+1}).

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[2] In Peng and Wang (2005), income and LPG preference heterogeneities are considered as the two driving forces of stratification in a static setup.

[3] In the endogenous-sorting framework, the cardinal properties of preferences are important. Particularly, in the case where $\ln G_{t+1} < 0$, one needs a sufficiently large value of ζ (such that $\zeta + \ln G_{t+1} > 0$) to guarantee that those with higher γ would prefer to reside in a location closer to the LPG site.

[4] The specification of the separable quasi-linear utility function ensures that the willingness to pay for the LPG is free of wealth effects and yields clean analytic solution. Under this setup, the preference parameter γ affects individual decision only through locational choice.