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Unequal opportunities and human capital formation ☆

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Abstract

This paper develops a tractable, heterogeneous agents general equilibrium model where individuals have different endowments of the factors that complement the schooling process. The paper explores the relationship between inequality of opportunities, inequality of outcomes, and aggregate efficiency in human capital formation. Using numerical solutions we study how the endogenous variables of the model respond to two different interventions in the distribution of opportunities: a mean-preserving spread and a change in the support. The results suggest that a higher degree of inequality of opportunities is associated with lower average level of human capital, a lower fraction of individuals investing in human capital, higher inequality in the distribution of human capital, and higher wage inequality. In particular, the model does not predict a trade-off between aggregate efficiency in human capital formation (as measured by the average level of human capital in the economy) and equality of opportunity.

JEL classification: J24; J31; O15; D33
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1. Introduction

The importance of human capital accumulation as an engine of economic growth and development has been widely recognized in theoretical and empirical studies.[1]

Most of the literature that studies the effects of income inequality on economic growth through its effects on human capital accumulation has focused on the role of credit constraints. The main idea of this line of research is the following: relatively poor individuals don't have the

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[1] The reader is referred to the seminal contributions of Lucas (1988) on the theoretical side, and those of Mankiw et al. (1992), Benhabib and Spiegel (1994, 2005) and Barro (2001) for the empirical evidence supporting the importance of human capital in explaining growth rates across countries.

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means to finance the accumulation of human capital, and, because they are credit constrained (that is, there is no way to finance the costs of human capital accumulation using future earnings as the collateral for a loan to pay the tuition fees and living expenses), they end up either not investing in human capital or investing very little. Furthermore, if in addition to credit constraints there are decreasing returns to the accumulation of human capital, the final outcome does not maximize the size of the economic pie. Consequently there may be space for redistribution of resources from rich to poor individuals which, in turn, increases the size of the pie. This redistribution would reallocate resources towards more profitable investments given that the marginal returns to human capital accumulation are higher for those individuals (the relatively poor ones) who have less human capital. The theoretical idea has been extensively developed in the literature since the work by Galor and Zeira (1993) and Banerjee and Newman (1993).[2,3]

But the accumulation of human capital involves other complementary factors as well. This has been extensively documented in a number of recent empirical studies, some of which will be reviewed in the next section. While some of these complementary factors are either non-purchasable or beyond the individual's control once the time to make human capital investment decisions comes (family background, parental education, socio-economic characteristics, race, genes, culture, provision of social connections, installation of preferences and aspirations in children, etc.), others are (neighborhood effects, distance to schools, and different qualities of books, teachers and schools).[4] The explanation provided in this paper for how inequality affects aggregate efficiency in human capital formation does not rely on credit market imperfections because, as we will argue in the next section, there are crucial complementary factors to the schooling process that are non-purchasable in the market *once the time to make investment decisions in human capital formation comes*. More precisely, this paper explores another, perhaps complementary, explanation for the negative relation between economic inequality and the average level of human capital which does not rely on credit market imperfections and is based on differences in the rates of return to time investment in human capital accumulation, the latter being determined by each individual's endowment of the complementary factors to the schooling system. Despite the fact that it is sometimes difficult to disentangle exactly which factors cannot be attributed to income or wealth differences, the next section documents a series of empirical results where non-purchasable factors such as race, the composition of the household (e.g. no mother or father in the household), ethnic group, and parental schooling significantly affect different measures of educational attainment (even after one controls for family income or wealth). These non-purchasable factors that complement time and effort in the formation of human capital can be thought of as John Roemer's set of "pre-determined circumstances" or aspects of an individual that are beyond her control once the time to make human capital investment decision comes, and for which society should not hold the individual responsible (Roemer, 2000, 2002, in press).

If the previously mentioned factors are important in determining differences in educational attainment across individuals, the distribution of these (non-purchasable) "socio-economic characteristics" across individuals matters. In other words, if the distribution of factors that complement the schooling process matters, one should encounter differences in educational attainment across individuals even in economies with universally free public schools.[5] The model is capable of generating two stylized fact relationships observed in the data which will be described in detail in the next section. These are, first, the negative relationship between average human capital and inequality in the distribution of human capital, and second, the positive correlation between educational opportunities and educational and income outcomes. The truncated shape of the human capital Lorenz curves is also a motivating fact that the model is capable of generating and which, in some sense, is behind the negative relationship between inequality in the distribution of human capital and the average level of human capital. In sum, Roemer meets Hanushek in a simple general equilibrium model.[6]

This paper is related to the literature that links economic inequality and human capital accumulation (see, among others, Galor and Zeira, 1993; Bénabou, 1996, 2000a, 2000b; Ferreira, 2001; Glomm and Ravikumar, 1992; Fernández and Galí, 1999). While

[2] See Aghion et al. (1999) for a thorough review of this literature. Further developments have been proposed by De Gregorio (1996) and Bénabou (1996, 2000a,b).

[3] Empirical evidence has been found in favor of the hypothesis that inequality and credit constraints affect investment in human capital by Flug et al. (1998), De Gregorio (1996) and Mejía (2003).

[4] See Schultz (1988), Roemer (2000), Benabou (2000a,b), Carneiro and Heckman (2002) and Dardanoni et al. (2003), among others.

[5] This does not rule out the importance of the lack of financial resources to pay for the (monetary) costs of education. In fact, family income has been found to have large explanatory power on longitudinal studies of educational outcomes across individuals.

[6] We thank one of the anonymous referees for pointing this phrase out.