An adjustment cost model of social mobility

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A B S T R A C T

We analyze herein the effects of the human capital adjustment cost on social mobility. Such an adjustment cost is modeled as a rising marginal cost schedule for augmenting human capital. We use a general human capital technology, which disentangles the adjustment cost from the depreciation cost of the human capital. Missing credit markets prevent individuals from equalizing the initial differences in the human capital. We find that a higher adjustment cost for human capital acquisition slows down the social mobility and results in a persistent inequality across generations. On the other hand, a higher rate of human capital depreciation could increase mobility via a positive effect on new investment. The quantitative analysis of our model suggests that the human capital adjustment cost is nontrivial to account for the observed persistence of inequality and social mobility. In addition, we find that the government redistribution policy could account for the large observed variation in estimates of social mobility.

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1. Introduction

It is an open question whether the son of a poor farmer will become a highly paid executive manager. The evidence during the last two decades is mixed. A large body of literature documenting intergenerational income elasticity provides disparate evidence of social mobility. Although Machin (2004) and Clark and Cummins (2012) argue that there is considerable persistence in the wealth status of households in England from 1800 to 2012, other papers such as Grawe and Corak (2004) document considerably faster social mobility. Social mobility is an important issue in macro-development literature because it is inextricably connected to the intergenerational persistence of the inequality or dispersion of wealth. If income inequality is persistent, social or intergenerational mobility is likely to be slower.[2] The seminal paper of Becker and Tomes (1979) draws the conclusion that a stable distribution of income could be explained by individual and market luck. Their crucial assumption is that the credit market is perfect, implying that individuals with low wealth and a high marginal product of capital could borrow from individuals with the opposite trait. This tends to equalize the differences in wealth. The residual inequality is then mostly attributed to luck. Since then a considerable body of literature (e.g., Loury, 1981; Banerjee and Newman, 1993; Galor and Zeira, 1993; Benabou, 1996; Mulligan, 1997; Bandyopadhyay and Basu, 2005; Bandyopadhyay and Tang, 2011) has evolved emphasizing the role of credit market imperfection in perpetuating the inequality.

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[2] Although social mobility is a broader notion of a change in social status, including occupation, we use this term narrowly to indicate the intergenerational mobility of wealth where the wealth is primarily intangible human capital.

In this paper we explore the role of the adjustment cost, a relatively ignored feature of human capital production, on social mobility. The human capital adjustment cost is modeled as a rising marginal cost of augmenting human capital that is measured in terms of foregone consumption. Such an adjustment cost can arise for a number of reasons. First, there could be basic human inertia to respond to change and adjust to new opportunities or a new environment. An example of such inertia is where adults find a better job opportunity with higher pay in a region that is remote from their home town but due to friends and family ties they are reluctant to move (Alesina and Giuliano, 2010). Similar sluggish and varied responses to opportunity are found in the study of Katz et al. (2001) where adults in high poverty inner cities in the United States respond rather sluggishly to a subsidized move to low poverty regions; this is known as the Moving to Opportunity for Fair Housing (MTO) program. Second, a similar adjustment cost could be attributed to market based factors such as the higher cost of an advanced education compared to primary schooling or a higher employment adjustment cost as in Hansen and Sargent (1980). We show that the presence of such an adjustment cost of human capital could impede the process of social mobility.

We develop a model with missing credit and insurance markets as in Loury (1981), Galor and Zeira (1993), and Benabou (2000, 2002). Individuals differ in terms of the initial distribution of human capital and productivities, which cannot be hedged using credit and insurance markets. In this environment, a higher adjustment cost impedes social mobility through the following transmission channel. When the credit market is missing, the investment opportunities facing individuals (investment in human capital or education in our model) are limited to the resources that they have in hand. Given a production function with private diminishing returns to reproducible human capital, poor people with lower human capital have a higher marginal product than rich people. Thus, relative growth potential of poor people is higher. However, if a human capital adjustment cost is present, this growth of the poor will be impeded because they face a higher marginal cost of investment when they try to grow. Thus, the adjustment cost will slow the process of social mobility leading to a higher persistence of human capital inequality in the aggregate. The central point of our paper is to demonstrate that a society facing such a costly adjustment of human capital could experience persistent inequality and low social mobility measured by the intergenerational elasticity of income. Although an adjustment cost is a standard feature in any physical capital production function, quite surprisingly, its role has been ignored in the inequality and social mobility literature.

Our functional form for the human capital technology is more general compared to the extant literature (e.g., Benabou, 2000, 2002). We parametrize two major costs of human capital acquisition, namely the adjustment cost and the depreciation cost. The depreciation of human capital could be attributed to the inherent obsolescence of skills. Using such a general functional form for human capital production, we also show that a higher depreciation of human capital could expedite social mobility. This is because a high depreciation of human capital triggers a greater investment in human capital to replenish the human capital lost due to obsolescence. Incomplete depreciation of human capital makes social mobility dependent on the history of inequality. It also enables us to understand intergenerational knowledge transfer in the spirit of Mankiw et al. (1992). To the best of our knowledge, a human capital production function allowing for an adjustment cost as well as the incomplete depreciation of human capital in determining social mobility has not been explored in the literature.[3]

In our model, in the spirit of Galor and Zeira (1993), adults receive a warm-glow utility from investing in their child's education. As in Loury (1981), human capital is the only form of reproducible capital in the economy and the credit market is missing. Idiosyncratic productivity shocks, together with an initial difference in human capital and missing credit markets, give rise to a cross-sectional inequality that transmits from one generation to another. The absence of credit and insurance markets prevents agents from mitigating negative idiosyncratic shocks. Unlucky agents experiencing a negative productivity shock invest less resources in their child's education, which means that the child inherits less human capital. How quickly the offspring overcomes this disadvantage depends on how costly it is to adjust the human capital. We develop a novel closed form analytical solution for the endogenous law of motion of inequality. The key theoretical result is that inequality is persistent and social mobility is less in economies with a higher human capital adjustment cost or a lower depreciation cost of capital. In addition, social mobility is less in more unequal societies. Since inequality is history dependent in our model, social mobility also shares the same property. In our quantitative exercise, we explore how the adjustment cost and depreciation costs alone can explain the observed social mobility. We find that the human capital adjustment cost has nontrivial effects on social mobility and long-run inequality. On the other hand, the depreciation cost has quantitatively minor effects on these variables. Our calibrated social mobility parameter is in accordance with the slow social mobility predicted by Mazumder (2005) and Clark and Cummins (2012). Adding a redistributive government policy with public funding of education significantly alters the calibrated social mobility. A pro-poor public service program expedites intergenerational mobility and brings the estimate of intergenerational earnings elasticity on par with the majority of studies.

Using our adjustment cost model, we also calibrate an adult's human capital response to luck. In the absence of any other estimate of such a response, we target the response rate of adults in the well-known MTO program (reported by Katz et al., 2001) where adults are given the opportunity to move away from a high poverty region. Our adjustment cost model is in accordance with the response rate of adults to the MTO program. The resulting impulse responses of human capital with

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[3] Ben-Porath (1967) uses a human capital production function that has a similar tenor to ours. He explores the implications of the rising marginal cost of investment in human capital. However, he does not explore the implications of such a rising marginal cost for social mobility, which is the main theme in our paper.