Intergenerational correlation and social interactions in education[☆]

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ABSTRACT

We propose a dynastic model where individuals are born into an educated or uneducated environment that they inherit from their parents. We study the impact of social interactions on the correlation in parent-child educational status, independently of any parent-child interaction. When the level of social interactions is decided by a social planner, we show that the correlation in education status between generations decreases very fast as social interactions increase. In turn, when the level of social interactions is decided by the individuals themselves, we show that the intergenerational correlation still decreases, although less rapidly than with exogenous social interactions.

1. Introduction

Explaining the educational outcomes of children is one of the greatest challenges for economists. Most studies have found that school quality (e.g., Card and Krueger, 1992) and family background (e.g., Ermisch and Francesconi, 2001; Plug and Vijverberg, 2003) have a significant and positive impact on children's level of education. Parents obviously influence their children's school performance by transmitting their genes, but also influence their children directly, via, for example, their parenting practices and the type of schools to which they send them (Björklund et al., 2006; Björklund and Salvanes, 2011). Neighborhood and peer effects also have an important impact on the educational outcomes of children (Durlauf, 2004; Ioannides and Topa, 2010; Sacerdote, 2010; Patacchini and Zenou, 2011; Topa and Zenou, 2015).

We study the intergenerational relationship between parents' and offspring's long-run educational outcomes. It is well-documented that students' educational achievement is positively correlated with their parents' education, or with other indicators of their parents' socio-economic status (Björklund and Salvanes, 2011). In the present paper, we illustrate how this correlation can result from peer effects, abstracting from any direct parental influence. We also analyze how variations in social interactions translate into variations in intergenerational correlation.

There have been many attempts in the literature to analyze how the intergenerational correlation could be reduced by focusing on the direct influence that parents have on their children (Björklund and Salvanes, 2011). However, Calvó-Armengol and Jackson (2009) show that the correlation between a parent's and a child's outcomes can be explained without invoking any direct influence, but rather by virtue of the fact that they share a common environment, which affects their decisions. This provides us with a new channel of intervention that reduces the parent-child correlation, which this paper aims to examine.

We develop a dynastic model where, at each period of time, with some probability, a person (the parent) dies and is

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simultaneously replaced by a newborn (the child). The child thus never interacts with his parent and does not inherit any of his idiosyncratic characteristics. Instead, newborns inherit the environment (local community) where their parents lived. In our paper, the environment is modeled as a dyad in which the newborn interacts with a partner, called his *strong tie*. This strong tie represents the environment with which the parent interacted before he died. Using the language of the cultural transmission literature (Bisin and Verdier, 2000, 2001), in our model, there is no vertical transmission (i.e. socialization inside the family), but only horizontal transmission (i.e. socialization outside the family).

We start with a benchmark model where newborns only interact with their strong tie. When they are born, they discover the environment they are in, i.e. the educational status of their strong tie, and then decide whether to get educated or not. We show that, even if a parent never interacts with his child, there is still a significant positive correlation between the educational achievement of the parent and the child. A parent has a higher (lower) probability of being educated if he lives in a favorable (unfavorable) environment. Because the child shares the same environment, the probability that the child will get educated is also higher (lower). This benchmark model allows us to derive simple expressions for both the average level of education at steady state and the level of intergenerational correlation.

We then extend this model to introduce the opportunity for individuals to interact with peers outside their local community (*weak ties*). Since individuals start interacting with weak ties, strong ties have less influence on their education, and this mechanically decreases the parent-child correlation. We model social interactions as the fraction of time a newborn spends with weak ties and consider two cases: in the first, the level of social interactions is exogenously fixed by a social planer, and in the second, it is decided by the newborns themselves. In both cases, we show that peer effects, defined here as interactions with both types of ties, have major implications for public policies aimed at reducing social inertia.

Indeed, when the socializing decisions are exogenously made by the social planner, we show that the correlation in education status between generations decreases very fast as social interactions increase. Actually, the decrease in correlation is a power four of the increase in social interactions. Hence, a social planner promoting social mobility will force individuals to interact as much as possible, in which case we also show that the average level of education does not change compared to the benchmark case. However, this policy decreases social welfare. This is because, while individuals born into an unfavorable environment benefit from such a policy, those born into a favorable environment are penalized, as they now interact with potentially uneducated individuals. The net effect turns out to be negative, the losses of the former not being fully compensated by the gains of the latter. This illustrates a common social planner's trade-off between equity (i.e. decreasing intergenerational correlation) and efficiency.

When the socializing decisions are made by the individuals, those with uneducated strong ties always want to meet weak ties, while the reverse applies to individuals with educated strong ties. This is simply because the former will, in the worst case, meet another uneducated person and, at best, meet someone educated, and the reverse will happen for the latter. We show that when individuals can escape their inherited environment, the intergenerational correlation still decreases with respect to the benchmark case, but the extent to which it decreases depends on the average level of education in the population. The higher the proportion of educated individuals, the higher the impact of social interactions.

Finally, we show that when socializing decisions are made by the individuals, the average education level at steady state increases, contrary to the case where interaction choices are exogenous. Therefore, a social planner who lets individuals choose their own interaction levels should be promoting education. This in fact has two effects: the direct effect of increasing the education level in the population, and the indirect effect of decreasing the intergenerational correlation through the first effect.

The rest of the paper unfolds as follows. In the next section, we relate our model to the relevant theoretical literatures. Section 3 presents the model without social interactions while Section 4 focuses on exogenous levels of social interactions. In Section 5, we examine endogenous levels of social interactions, since individuals choose how much time they spend with weak and strong ties. In Section 6, we provide empirical evidence of the results obtained in Section 5.[1] Section 7 concludes. All proofs of propositions, lemmas and remarks can be found in Appendix A.

2. Related literature

Apart from the paper by Calvó-Armengol and Jackson (2009),[2] our model is related to different literatures. First, it is related to the literature on peer effects in education. De Bartolome (1990) and Benabou (1993) are the standard references for peer and neighborhood effects in education. In this multi-community approach, individuals can acquire high or low skills or be unemployed. The costs of acquiring skills are decreasing in the proportion of the community that is highly skilled, and the higher the skills acquired, the greater the decrease in costs. This leads to sorting, although ex ante all individuals are identical. While there is an extensive empirical literature on the intergenerational transmission of income and education that focuses on the correlation of parents' and children's permanent income or education (Björklund and Jäntti, 2009; Black and Devereux, 2011; Björklund and Salvanes, 2011), there are very few theoretical models exploring this issue. Ioannides (2002, 2003) analyzes the intergenerational transmission of human capital by explicitly developing a dynamic model of human capital formation with neighborhood selection. The idea here is to study the impact of both parental education and the distribution of educational attainment within a relevant neighborhood on child educational attainment. From a theoretical viewpoint, Ioannides obtains a complete characterization of the

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[1] This paper is clearly a theoretical contribution. The empirical evidence should only be understood as anecdotal, and not considered a full-fledged empirical validation of our model.

[2] Contrary to their paper, we consider the impact of social interactions through weak and strong ties on the intergenerational correlation in education.