Family linkages, social interactions, and investment in human capital: A theoretical analysis☆

Qing Wang [a], Xiangrong Yu [b,∗]

[a] *HSBC Business School, Peking University, Shenzhen, China*
[b] *University of Wisconsin-Madison, Madison, WI, United States*

A R T I C L E   I N F O

A B S T R A C T

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This paper introduces parent–child interactions into the Beckerian model of human capital. The acquisition of human capital, jointly determined by parental investment and child effort, is an equilibrium outcome of the intergenerational interactions, which is Pareto efficient within the family. We show that the equilibrium output of human capital is not affected by the parental authority over child behavior, but it is usually lower than the level that maximizes the instantaneous aggregate family welfare. In a family with more than one child, siblings not only compete for parental investments but also directly interact with each other in their effort choices. Exploring intragenerational connections and their interplay with intergenerational forces, we present a more complete theory of family linkages in human development and its implications for the rise and fall of families. Social interactions among children from different families induce intragenerational feedback effects that are further amplified by intrafamily interactions and accelerate regression toward the mean in the economic status of families. *Journal of Comparative Economics* **000** (2016) 1–16. HSBC Business School, Peking University, Shenzhen, China; University of Wisconsin-Madison, Madison, WI, United States.

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1. Introduction

Human capital is attached to individuals. Claims against children's education, knowledge, health, skills, or values are generally not enforceable, and therefore, access to capital markets to finance investments in children is imperfect. Family naturally plays a crucial role in financing human capital accumulation. In his most celebrated work (1964), Gary Becker develops a (Beckerian) framework modeling investments in children's human capital as rational choices of parents who are altruistic toward their children. Differences in human capital and hence in wealth of parents are transmitted to children

simply because of distinct financial constraints across families, despite the same level of parental generosity (Becker and Tomes, 1979, 1986). There has been a growing interest in the intergenerational transmission of human capital through family linkages; see Solon (1999) and Black and Devereux (2011) for recent overviews.

To invest in human capital is to invest in human beings. Children are not passive recipients of parental investments but active co-investors and/or producers of human capital.[1] The effort that children devote to learning activities largely determines the effectiveness of parental investments. Surprisingly, however, there is not much literature examining the interactions between parents and children in the formation of human capital. The vast empirical literature on returns to schooling and on-the-job training typically ignores the behavioral reactions of children as rational decision makers; in this aspect, it treats human capital investments no different than financial investments. We aim to fill this gap by allowing child effort to enter into the production of human capital so that interesting parent–child interactions arise.

In this extended Beckerian framework, the acquisition of human capital, jointly determined by parental investment and child effort, is an equilibrium outcome of parent–child interactions. We show that the decentralized equilibrium is Pareto efficient within the family in the sense that neither the parent nor the child can be better off without the other being worse off. However, human capital is a public good within the family—the child enjoys the future income it earns whereas the parent derives utility from it because of altruism. From an instantaneous viewpoint, the equilibrium represents an underproduction of human capital relative to the maximization of the aggregate family welfare. The parent does not take into full account the benefit of her investment to the family as a whole, while the child's effort choice obeys the same decision rule as in the instantaneous family optimum. Their asymmetric roles are clearly important for understanding family ties in the transmission of human capital. We further argue that a cooperative solution to achieve the family optimum cannot be sustained in the current setting, because there is no mechanism for any transfer from the child to his parent, and neither can the parent borrow from the market against the future income of her child. Instead, if one considers a dictatorial parent who can decide an effort level for the child but maximizes her own altruistic utility, her choice will coincide with the decentralized outcome under the liberal parent who does not directly control child behavior. Although in the same spirit of Becker (1974)'s "Rotten Kid Theorem," this analysis is new to the literature on human capital. It does not suggest that parenting approaches are irrelevant for human development; rather, it states that even the dictatorial parent is inevitably subject to the incentive compatibility constraint of the child.[2]

Moreover, human capital is accumulated within social groups. Interactions with siblings, classmates, neighbors, friends, and other peers shape children's attitudes toward education. There has been substantial evidence of both sibling effects (e.g., Hauser and Wong, 1989; Oettinger, 2000) and peer effects (e.g., surveyed by Epple and Romano, 2011) in education. The feedback effects within reference groups create channels for intragenerational transmission of human capital, which must also interplay with intergenerational family linkages. Then, some important questions need to be addressed: How do these two types of forces interplay within families? And, across families? What are the implications for the dynamics of human capital, the rise and fall of families, and the evolution of neighborhoods? A theory of intergenerational mobility has to account for the transmission of human capital along both inter and intragenerational dimensions and the interplay between them; so must a theory of cross-sectional income distribution and inequality. We introduce a social dimension of children's behavior into the Beckerian model with endogenous effort choice to pursue this line of analysis. Two kinds of reference groups are considered; one is siblings within the family, in which the parent exerts direct influences over behavior of all children, and the other is children from neighboring families, whose actions are out of the parent's control. Under a linear quadratic specification of the models, the notion of social multipliers is generalized to conceptualize the role of parent–child interactions in peer behaviors.

The behavior of children adapts to the interactions with their siblings while competing for resources from the parent. In the presence of positive spillovers of effort such as educational aspirations, coordination among siblings will lead to higher levels of human capital output than the noncooperative decisions for any given parental investments. However, parent–child interactions may offset the spillover effects and give the opposite result. Parent–child interactions can also eliminate potential multiple equilibria with strategic complementarities among siblings. These results largely originate from the structure of the interactions: a higher layer of interactions between the parent and children is imposed upon the standard inter-sibling game. As asserted by Becker (1964, p. 21), "No discussion of human capital can omit the influence of families on the knowledge, skills, values, and habits of their children." The analysis with sibling effects developed here enriches our understanding of family linkages in human capital formation.

Human capital transmission also extends beyond families to communities. Within a given neighborhood (residential community or reference group in a well-defined social space), the feedback effects among children counteract the pass-through of human capital from parents to children. These impacts on children's behavior also induce changes in parental investments, which generate a leverage effect that further offsets the influence of family background; this is a new insight provided by the model with endogenous parent–child interactions. The intragenerational feedbacks in the neighborhood then potentially accelerate regression toward the mean in the economic status of the families. We also explore the case with endogenous

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[1] A payment of college tuition, for example, does not automatically translate into college education unless the student wants it. Neither can one deny children's own desire to change their own lives through education, especially when they are from poor families.

[2] Parenting and early childhood intervention has been documented to be rather important, especially when they affect the formation of children's noncognitive skills, as emphasized by Heckman et al. (2006).