Effects of parental encouragement on their child's academic performance and remedies for poverty

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Abstract

Parental encouragement improves a child's academic performance, which reflects the individual accumulation of human capital and can prevent the child from becoming poor in the future. We provide a model to clarify the mechanism by which parental encouragement influences the child's efforts by considering parental time preference, wages, and background. We find that parents who have a child with low innate ability, high wages, strong time preference, and were given little encouragement from their parents in the past hesitate to encourage their child. Moreover, we indicate that educational institutes such as schools and local governments can reduce parents' time preference or increase the effectiveness of parental encouragement to prevent children from being poor in the future.

Keywords: encouragement, assistance, opportunity cost, time preference, poverty, school policy

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1 Introduction

According to the human capital theory proposed by Becker (1964), increasing accumulation of human capital improves individual wages in the labor market. Therefore, schoolteachers and parents support children to improve their academic performance, which reflects the level of individual human capital which can prevent them from becoming poor in the future.

Numerous studies have shown the positive effects of parental involvement on children's academic performance. Henderson and Mapp (2002) show that family support is effective in improving student's academic performance, attendance, and behavior, especially in middle and high schools. Hill and Craft (2003) explain the positive relationship between parent and school involvement and students' school performance by focusing on ethnic variations. Among the many parental behaviors, such as home-based activities, school-based selectivity, and parent-teacher communication, Steinberg et al. (1992) and Gunderson et al. (2013) indicate the positive effects of parental encouragement on children's academic performance. Darolia and Wydick (2011) clarify that students who are given encouragement from their parents show more effort at school compared to students who are given assistance, such as money and cars.

Dernbusch et al. (1987), Garg et al. (2005), and Newman et al. (2015) compare the results of students' academic performance by dividing parenting styles into authoritarian and permissive, and analyze the optimal parenting style.[1] However, few studies have focused on the effects of parents' time preferences and their backgrounds on student's academic performance. Some parents have a strong time preference; that is, they consider the current situation to be more important than the future, whereas others have a weak time preference; that is, they consider things in the long term. Moreover, some parents are familiar with the ways to encourage their children because they were encouraged by their parents in the past, and vice versa. These differences may generate various amounts of parental encouragement for their child as well as parenting styles, resulting in differences in children's efforts and their academic performance.

In this study, we provide a model to clarify the mechanism by which parental encouragement affects children's efforts by considering the level of

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[1]Altalib et al. (2013) classify parenting into four styles: authoritarian, authoritative, permissive, and democratic, and state that sociologists consider authoritative parenting to be the best in general.

parents' time preferences and backgrounds. Moreover, we examine the effects of the differences in parents' wages because we assume that parents' utility includes their consumption, as well as their children's future incomes.[2] From the model, we find that parents who have a child with high innate ability, low wages, and weak time preferences, and who were given enough encouragement by their parents tend to encourage their child. On the contrary, parents who have a child with low innate ability, high wages, and strong time preferences, and who were given little encouragement by their parents in the past tend not to encourage their child.

Next, we indicate some remedies for poverty alleviation by classifying the types of children based on the results from our model. Educational institutions such as schools and local governments can reduce parents' time preferences and increase the effectiveness of parental encouragement. These actions encourage parents to give their children optimal encouragement which can be a remedy for poverty alleviation.

In the following section, we analyze a model that explains the relationship between parental encouragement and a child's effort to increase academic performance under perfect and imperfect information. In Section 3, we classify the types of parents and show their children's academic performance, which is based on their efforts. In Section 4, we classify the types of children and examine the optimal remedies for poverty alleviation in each case. Section 5 provides concluding remarks.

2   The model

2.1   Under perfect information

To increase income, individuals must make an effort to increase their accumulation of human capital during childhood. We can observe the level of individual human capital based on their academic performance at school. Parental encouragement is effective in encouraging children to make efforts. For example, parents recommend their children to find opportunities to go abroad and know the importance of learning foreign languages. Moreover, parents urge their children to engage in career experiences and learn the

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[2]Some previous studies assume that parents are altruistic and that their utility does not include their consumption.

things they must learn at school to be able to work in the labor market.[3] Parents also praise what their children do in daily life and encourage them to try whatever they like. This encouragement can act as a trigger to increase their children's motivation to study, efforts at school, accumulation of human capital, and future incomes. In addition, encouragement consumes parents' time. Parents have to observe their children, check the available options to increase their motivation, and decide which kind of encouragement is optimal for their children.

We propose a model based on Darolia and Wydick (2011) to clarify which types of parents tend to encourage their children to make efforts to increase their children's future incomes.[4] If the child's optimal effort is not significant enough to earn an income to survive, I, parents give them assistance, such as money, commodities, and cars.

First, we consider the situation of perfect information about a child's innate ability. That is, each child knows their own innate ability, θ_i as well as that of their parents. The utility function of child i is formed as:

$$U_c = \delta_i^c(\theta_i \ln(e_i) + d_s S_i) - e_i, \tag{1}$$

where δ_i^c is the discount rate of a child and $0 < \delta_i^c < 1$ is satisfied. When the child has a strong time preference, the discount rate is low and vice versa. e_i is the level of child i's effort and $\ln(e_i)$ is child i's academic performance. $\theta_i \ln(e_i)$ is a child's future income and d_S is a dummy variable. S_i is the amount of assistance provided by the parents and is determined as follows:

$$S_i = I - \theta_i \ln(e_i). \tag{2}$$

The derivation of (1) for e_i is as follows:

$$\frac{\partial U_c}{\partial e_i} = \frac{\delta_i^c \theta_i}{e_i} - 1 = 0. \tag{3}$$

Therefore, the optimal effort level for child i, e_i^*, is the same as the discount present value of innate ability. In other words, $e_i^* = \delta_i^c \theta_i$ is satisfied.

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[3]Royalty (1996) indicates that job training significantly affects turnover.

[4]We introduce factors that affect the amount of encouragement, such as parents' time preference, wages, and backgrounds. Moreover, we assume that parents include their own consumption in their utility, while Darolia and Wydick (2011) assume that parents are altruistic, and that their utility function incorporates their children's utility and excludes their own consumption.

When $\theta_i \ln(e_i^*) \geq I$ is realized, parents do not give their child any assistance and $d_S = 0$ is satisfied. By contrast, when $\theta_i \ln(e_i^*) < I$ is realized, the parents give assistance to their child, $I - \theta_i \ln(e_i^*)$, and $d_S = 1$ is satisfied. Since the child's effort is decided based on the discount present value of their innate ability, parental encouragement is not effective in increasing their child's effort under perfect information.

2.2 Under imperfect information

In this section, we assume imperfect information about a child's innate ability. That is, a child does not know their own ability, whereas the parents do. Therefore, the child guesses it based on the amount of encouragement from their parents which determines the optimal level of effort. We classify the types of parents into nine groups, focusing on their backgrounds, time preferences, and wages, to clarify which type effectively increases children's future incomes.

To simplify, we indicate that parents who were given enough encouragement from their parents to earn incomes to survive, I in the past, are EN, while parents who were not given enough encouragement to earn I and were given assistance to survive are AS. Next, we imply that parents who have strong time preferences are STP, whereas parents who have weak time preferences are WTP. Finally, we denote that parents whose wages are high are HW, and parents whose wages are low are LW.

The following is the classification of the types of parents. Parents who belong to Type 9 earn too little income to give their children enough encouragement to realize the child's income to survive, I, regardless of their backgrounds and levels of time preference. We refer to these parents as LLW.

Type 1	EN, WTP, HW
Type 2	EN, WTP, LW
Type 3	AS, WTP, HW
Type 4	AS, WTP, LW
Type 5	EN, STP, HW
Type 6	EN, STP, LW
Type 7	AS, STP, HW
Type 8	AS, STP, LW
Type 9	LLW

The utility function of the parents is represented as

$$U_j^p = \delta_j^p(\theta_i \ln(e_i) - d_s C_j^s) + w_j(T - E_j), \tag{4}$$

where T is the parents' time in their lives, and E_j is the hours of parents j 's encouragement for their child. That is, $T - E_j$ is the number of working hours.[5] We assume that A_j is the effectiveness of encouragement and that $A_j > 0$ is satisfied. C_j^s denotes the assistance cost. A child makes an effort based on the amount of parental encouragement, which is denoted as $E_j^{A_j}$. Therefore, $e_i = E_j^{A_j}$ is satisfied, and (4) can be rewritten as:

$$U_j^p = \delta_j^p(\theta_i \ln(E_j^{A_j}) - d_s C_j^s) + w_j(T - E_j). \tag{5}$$

The value of A_j is determined based on the parents' background. Parents who were given encouragement from their parents in the past are familiar with some options, features, and advantages of providing encouragement. Then, the value of A_j increases and their encouragement effectively stimulates their child's effort. On the contrary, parents who were not given much encouragement from their parents in the past do not know their options well and their encouragement of their child becomes ineffective. Therefore, the value of A_j decreases.

The child determines the optimal level of effort by guessing the value of θ_i and observing the amount of encouragement from their parents, $E_j^{A_j}$. The derivation of (5) for E_j is as follows:

$$\frac{\partial U_p}{\partial E_j} = \frac{\delta_j^p \theta_i A_j}{E_j} - w_j = 0. \tag{6}$$

That is, we obtain the optimal hours for encouragement as

$$E_j^* = \frac{\delta_j^p \theta_i A_j}{w_j}. \tag{7}$$

The optimal level of a child's effort, e_i^{**}, can be introduced by (6) when each child knows the parents' wages, background, and time preference. Therefore, the child guesses their own innate ability from the amount of encouragement and determines the optimal effort, e_i^{**}, where $e_i^{**} = \delta_i^c \theta_i$ is satisfied.

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[5]Although there is time for household chores and leisure in real life, we omit them from the model because the main results are the same regardless of time.

When $e_i^{**} = \delta_i^c \theta_i \geq E_j^{A_j}$ is satisfied, optimal parental encouragement is efficient. In contrast, it becomes inefficient under $e_i^{**} = \delta_i^c \theta_i < E_j^{A_j}$, because some of the encouragement does not work.

3　Parental encouragement and child's effort

From the (7), we obtain the following four propositions:

Proposition 1 *High-ability children tend to be given encouragement from their parents, whereas low-ability children tend not to be given encouragement.*

Proof. From (7), we obtain that the parents' hours for encouragement of their child, E_j, is the increasing function of the child's innate ability, θ_i. Therefore, high-ability children receive more encouragement from their parents, and vice versa. ∎

This result is the same as that proposed by Darolia and Wydick (2011). Regardless of the assumption that parents are altruistic or not, parents tend to encourage their children with high innate ability because they can increase their incomes more than children with low innate ability and realize the higher utility of their parents.

Proposition 2 *Parents with high wages (Types 1, 3, 5, and 7) hesitate to encourage their child, while parents with low wages (Types 2, 4, 6, and 8) tend to encourage their child.*

Proof. From (7), we obtain that the parents' hours for encouragement of their child, E_j, is the decreasing function of the parents' wage, w_j. Therefore, parents with high wages do not spend their time on encouragement compared with parents with low wages. ∎

Proposition 2 indicates that the opportunity costs of parents with high wages are large, and that they prefer working to encourage their child and vice versa.

Proposition 3 *Parents with strong time preferences (Types 5, 6, 7,and 8) hesitate to give encouragement to their child, while parents with weak time preferences (Type 1, 2, 3, and 4) tend to give encouragement to their child.*

Proof. From (7), the parents' hours for encouragement of their child, E_j, is the increasing function of the parents' discount rate δ_j^p. As the parents who have strong time preferences have a low value of δ_j^p, they hesitate to devote their time to encouraging their child, while the value of δ_j^p for the parents who have weak time preferences is large and their hours for encouragement become longer. ■

Proposition 3 indicates that parents who have weak time preferences suffer less from delayed effects of children's performance by their encouragement compared to parents who have strong time preferences.

Proposition 4 *Parents who had experience in obtaining encouragement from their parents (Types 1, 2, 5, and 6) spend a longer time encouraging their children, while parents who were not be encouraged by their parents (Type 3, 4, 7, and 8) spend a shorter time encouraging their children.*

Proof. From (7), we obtain that parents' hours for encouragement to their children, E_j, is the increasing function of the effectiveness of encouragement based on the parent's experience, A_j. Therefore, parents who were given encouragement from their parents in the past spend a longer time for encouragement compared to parents who were not. ■

In this study, we consider that parents are not altruistic and care about their own incomes as well as their children's future incomes and focus on the opportunity costs of encouragement when the parents give encouragement to their children because these assumptions reflect real society. From these assumptions, we can conclude that parents' opportunity costs, time preferences, and backgrounds also affect the choice of parents, as Propositions 2, 3, and 4 suggest. These results imply that there is a low possibility that children with low innate abilities and have parents with high income who have strong time preferences and did not get enough encouragement from their parents (Type 7) can get enough encouragement from their parents. Therefore, due to little effort, they become poor and tend to depend on their parents to survive throughout their life.

4   Remedies to reduce poverty

From our model, we find that there are several types of children who will not be able to earn enough income to survive in the labor market under imperfect

information. We divide them into three groups based on the reasons they are poor and consider remedies to reduce poverty in each case.

Type A: Children with low innate ability
Type B: Children whose parents belong to Type 7
Type C: Children whose parents belong to Type 9

Remedies for Type A   Children who belong to Type A cannot earn more income than I, even if they show their optimal effort $e^{**} = \theta_i$ because of their low innate ability. For example, a child with disability belongs to this category. In this case, the government and school must support them so that they do not depend on their parents throughout their lives.

The Australian government considers that job training for disabled students is one of the features of education and supports students who face disabilities, learning difficulties, and autism through an educational program called Technical and Further Education (Yamanaka, 2006).[6] According to the Individuals with Disabilities Education Improvement Act (2004), the legislative act of the United States also mandates programs that provides individualized support to children with disabilities for future education, employment, and independent living during post-secondary education.

Remedies for Type B   Children cannot be given enough encouragement from their parents to obtain income I because of the conditions of parents' backgrounds, wages, and time preferences. Although governments and schools cannot intervene in others' backgrounds and wages, they can reduce parents' individual time preferences.

Ifcher and Zarghamee (2011), Pyone and Isen (2011), and Drichoutis and Nayga (2013) indicate that positive affect results in exhibiting greater patience toward money and reduces time preference. Guven and Hoxha (2015) show that happier people take more time to make decisions and are more concerned about the future than the present.

From these results, the school and local government can decrease parents' time preference by giving them happiness and introducing more encouragement. According to the parents' utility function, utility is formed by

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[6]The New South Wales Department of Education and Training (1998) shows that a teacher, school counselor, and specialist in transition programs from education to work hold meetings to make plans for individual students through the program.

their present income, their children's future income, and costs for assistance. While the school cannot change the children's and parents' incomes directly and provide children with any assistance, it can increase the effectiveness of encouragement and thereby, indirectly affect children's incomes. By providing parents with information on several available options, which increases children's motivation to make efforts, parental encouragement can be more effective. Therefore, parents can realize a higher future income for their child and increase their utility. This results in a decrease in parents' time preference. Furthermore, we can point out that children's time preference may be affected by parents' time preference, which becomes less when parents' time preference becomes weak. This tendency can increase the child's discount present value of innate ability. That is, children make more effort than before and increase their future income.

Remedies for Type C   Children who belong to Type C cannot obtain optimal encouragement from their parents because the parents need to work for their survival and cannot spend enough time providing encouragement and cannot realize the optimal encouragement E^*. Children lose the possibility of not being poor in the future because of the family's poverty. The government supports them by providing school supplies, uniforms, and education subsidies, and allows them go to school. Schools implement effective school policies that stimulate them to make efforts instead of their families.

Peers at school are an important factor in students' motivation. Dee and West (2011) and Olalekan (2016) indicate that peer groups make students feel comfortable and alleviate their boredom and anxiety. Since peer groups affect students' motivation to study and their academic performance, maintaining good classroom environment is necessary. Glass and Smith (1979), Finn and Achilles (1990), Grissmer (1999), and Biddle and Berliner (2002) show a positive impact of students' academic performance in a smaller class and prove that class-size reduction is one of the school policies for boosting individual motivation.

Through the good educational environments and several options to increase motivation to study provided by schools, children can increase their efforts at school and earn sufficient income to survive in the future even if their parental encouragement is not enough to boost their efforts.

5   Conclusion

In this study, we examine the effects of parental encouragement on children's academic performance by considering the effects of parents' backgrounds, wages, and time preferences. We then clarify the types of parents who tend to encourage their child or hesitate to encourage their child and causing their child to become poor in the future. Moreover, we consider remedies for poverty alleviation provided by the government and schools, focusing on parents' types and child's innate ability.

The findings indicate that parents who have a child with high innate ability, whose wages are low, who have a weak time preference, and who were given enough encouragement from their parents tend to encourage their child. On the contrary, parents who have a child with low innate ability, whose wages are high, who have a strong time preference, and who were given assistance from their parents hesitate to encourage their child and tend to give them assistance for survival.

To prevent children from becoming poor in the future and to allow them to live independently without parental assistance, we propose some remedies. It is difficult for educational institutes, such as schools and local governments, to access parents' backgrounds and wages. However, these institutions can reduce the parents' time preferences. Moreover, they can increase the effectiveness of encouragement from parents by providing information about opportunities that stimulate children's efforts at schools. These actions encourage parents to encourage their child more and realize the child's efforts at school, which results in improving their wages in the labor market in the future.

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