Motives for Intergenerational Transfer: Parental Investment in Education

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Abstract

In response to growing concern about the increasing private tutoring cost,this study seeks to discover what determines private tutoring costs in a family drawn from Becker's model. Is private tutoring simply due to an "education mania" syndrome or severe competition embedded in society? Or is it a reasonable response of parents to low quality and poorly funded public schools? By examining this question, this paper can inform policy decisions concerning how the school system should be redesigned or modified, in order for public education to reduce the social inequality gap. The findings reveal that students with higher performance are more likely to receive private tutoring regardless of the quality of school inputs. It offers the several policy implications such that equalization policy is not effective in reducing the excessive parental inputs in private tutoring and it is necessary to differentiate the level of educational service in public as well as private schools.

Keywords: Parental Investment, Education, Private Tutoring

1. Introduction

Education is one of the primary public provisions around the world, regardless of whether a country is developed or developing. Given the necessary intervention of governments in education, monopolistic service provision by governments has been considered to be one of the factors causing inefficiencies in the education. In this sense, much research on the U.S. educational system has focused on the low performances of students, leading to discussion of how school systems should be designed or changed (Krueger, 1998; National Commission on Excellence in Education, 1983).

At odds with the concerns of the educational system in the U.S., Korean students have consistently ranked in the top in internationally comparable tests of math and science (Trends in International Mathematics and Science Study: TIMSS). However, Koreans view their own educational system less favorably than people from other countries do. Concern about the inefficient public provision of education has emerged from a different perspective in Korea: the over-investment in private education and tutoring, for which parents bear a heavy financial burden.

Comparing public and private spending on K-12 education as a share of GDP, the statistics shows that the total spending for education in Korea is relatively high, but the contribution of the public sector has been steadily low compared to other OECD countries. Moreover, a detailed examination of private tutoring costs across levels of income in families reveals that the percent of private tutoring costs among total household expenditures is increasing with higher income. This phenomenon challenges the basic notion of government intervention in education: education plays a role in reducing socially inequality between the poor and the rich. If private tutoring enhances student performance, then it can ultimately help increase cognitive attainment, leading to a larger income. As a result, private tutoring exacerbates social inequity. Therefore, this study seeks to discover what determines private tutoring costs in a family. Is private tutoring simply due to an "education mania" syndrome or severe competition embedded in Korean society? Or is it a reasonable response of parents to low quality and poorly funded public schools? By examining this question, this paper can inform policy decisions concerning how the school system should be redesigned or modified, in order for public education to reduce the social inequality gap. Besides implications for education policy in Korea, this study makes several contributions to unresolved areas.

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First, it sheds light on the interaction between the family and school inputs. Since the Coleman report (1966), which emphasized the importance of family behavior in education, many scholars have analyzed the effectiveness of school inputs on student performance (Hanuschek, 1997; 2003; Ferguson & Ladd, 1996). Over the last several decades, there have been significant refinements of conceptual and empirical models emphasizing the importance of parental behavior. Empirical research, however, has lagged behind in studying the interactions between parents and schools (Bonersronning, 2004). Parents make a lot of decisions regarding which schools to send their children to, how much time to invest in caring for their children, and how much to spend on their children's education. Many parental decisions could potentially affect their children's school performance, and they could be affected by the school environment. For example, parents may trade off child-care time against the level of school expenditure or class size (Kim, 2001; Bonersronning, 2004; Flyer and Rosen, 1995; Das, Krishnan, Habyarimana, & Dercon, 2004; Datar and Mason, 2008). Thus, if parental responses are not accounted for in production functions, their omission could lead to distort the effects of schooling on student performance. To figure out how parents interact with and respond to the external environment would be helpful to our understanding of the dynamics underlying a return to schooling.

Second, previous research has pointed out that the demand for private tutoring partly reflects parents' react to the poor quality of public education (Dang, 2007). However, empirical inquiries have not extensively explained how parents invest in private tutoring in response to the public education. Rather, previous studies focused on the influence of family characteristics(Tansel and Bircan, 2006; Dang, 2007). Or identification strategy in the paper did not clear the endogenity problems (Kim and Lee, 2002). Well-documented information in Korea education offers the paper to investigate the underlying dynamics of family behavior as a determinant of spending for private tutoring, filling in the gap left by other researchers by using an empirical approach.

Third, this paper also analyzes how resources within the household are allocated among families. Since Becker's theoretical foundations, numerous studies have explored family behavior within the household, such as the interaction between the quality and quantity of children (e.g., Becker and Tomes, 1976) and different family investments between boys and girls (Alderman and King, 1998). This research could help with an understanding of the behaviors of families.

The structure of this paper is as follows. Section 2 provides background on the educational system in Korea. Section 3 reviews the literature on family behavior and the determinants of private tutoring, and describes the theoretical framework for this paper. Section 4 presents the data and the econometric model used in the analysis. Finally, section 5 and section 6 discusses the results from the empirical model and implications of the findings.

2. Background

The Korean educational system has received much attention due to characteristics such as the huge level of parental involvement in education, its remarkable economic growth, and the high performance of its students. This section briefly introduces the basic policy setting of the Korean educational system.

Centralization is a feature of the Korean educational system, affecting everything from financing methods and curriculum to the number of enrolled students and administrative systems. Unlike other countries, where private schooling can play a role in providing alternatives for parents and students, private schools in Korea cannot differentiate themselves in terms of quality because of strong regulation by the central government. In an environment where parents cannot choose their schools, there are no essential differences between private and public institutions. Thus, with regard to financial conditions, the level of education should be equally distributed across the types of schools. In this sense, a significant amount of government subsidies are given to private schools.

With regard to financial resources, schools do not rely on local property taxes but on aid and support from the central government under an equalization policy. The revenue ratio of K-12 education in Korea consists of 72% from the central government, 21% from local governments, and 6% from schools' own revenues, such as tuition fees.

However, the contribution from local governments simply reflects the transfer from central government to local financial reports in government budget areas. One of the unique education system in Korea is an equalization policy, which was adopted in 1970s and expanded across the country until 1980. The underlying rationale for this policy was to give equal opportunity to every student to be educated, by reducing the quality gaps among schools. Kim and Lee (2002, p. 5) summarize the equalization policy as follows:

"It replaced the individually administered entrance exam with a random allocation of students within school districts. Students were randomly assigned by lottery to different schools in a district, regardless of whether they were public or private, as long as the student passed a nation-wide qualification examination. It equalized levels of tuition, the salaries of teachers, and the curriculums among private and public schools, through strong regulations and necessary financial assistance to private schools."

Under the equalization policy, strong regulation alleviated the severe competition among schools but failed to reduce competition among students. Demand for the private tutoring still exist and have even spread out across students in an equalized area. Table 1 shows the private tutoring practices in Korea.

[Table 1] Private tutoring practices in Korea

Monthly income (thousand dollars)	Total	Below 1	1-2	2-3	3-4	4-5	5-6	6-7	7-
% of private tutoring expenditure	22.2	5.3	10.7	17.7	24.1	30.3	34.4	38.8	46.8
% of households investing in private tutoring	77	36.9	59.7	77	84.4	89.2	90.5	92.7	93.5

Sources: Korea National Statistical (http://www.nso.go.kr)

3. Conceptual Framework of Parental Investment in Education

3.1 Family behavior

Many scholars who study the family acknowledge a debt to Gary Becker's seminal work. Becker's contribution to this line of inquiry was to apply an economic approach to the family: "individuals maximize their utility from basic preferences that do not change rapidly over time, and … the behavior of different individuals is coordinated by explicit and implicit markets"[2] (Becker, 1981). However, a more fundamental contribution of Becker's work concerns his auxiliary assumptions for the theoretical models: preferences, household production and collective choice.

Based on his model, Becker reaches a conclusion about the optimal point, that "parents will invest in human capital for each child until the marginal rate of return on human capital investment in that child equals the return available on financial investments" (Becker, 1965). Beginning with Becker's wealth model, theorists went further in their work on family behavior to relax Becker's auxiliary assumptions. Becker and Tomes (1976) assume that parents pay attention to each child's total wealth, but are unconcerned with the sources of wealth: thus, parents do not differentiate earnings and transfers as components of the wealth of their children. Despite Becker's contribution to the study of the family, there are areas that possibly need to be investigated more. One at issue is Becker's assumption of altruistic preferences by parents.

Based on this assumption, a number of studies could focus on the trade-off between the quality and quantity of children and, thus, lay out theoretical explanations for fertility and economic growth (Becker & Tomes, 1976). However, this theoretical discussion does not address whether or not a child gets an optimal investment from the perspective of society, nor show how this optimal point can be defined (Purkayastha, 2003). Due to the externality issue, parents might invest less in children, which could be an optimal point for society.

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[2] In his later work, Becker accepts the limitation of assumption that preferences are fixed and stable, introducing new models of preference formation and change (Becker, 1996).

3.2 Education production function

The education production function is one of common approaches in the education field. The basic premise is that researchers simply adopt the concept from the production theory of firms, and then apply it to the relationship between school inputs and educational output. The basic presentation of the education production functionis as follows: the achievement of ith student, Q_{it} at time t is influenced by family background $(F_i^{(t)})$,peers$(P_i^{(t)})$, school inputs$(S_i^{(t)})$, innate abilities(I_i), andunobservable districts or school-specific effects(δ).

Based on this general structure, an extensive series of empirical studies has been conducted to estimate the characteristics of production functions. The impact of school input has been the main focal point for policy researchers, because it directly reflects how much outcomes will increase per more invested resources. However, acknowledging that the public provision of education is a complex process, the education production approach requires accurate information on the quality and quantity of inputs within, as well as outside of, schools (Rice and Schwartz, 2008). Otherwise, omitted variables often generate biased estimates. Thus, a major concern about the estimated impact of school inputs is the presence of unobserved variables that could be correlated with the other independent variables in the model. Furthermore, various inputs have a continuing effect on the output of the production process, requiring extensive data sets. As a result, numerous studies have used data on spending as a proxy variable for the amount of input.

However, research on the impact of school expenditures has shown inconsistent results (Hanushek, 1986). Thus, studies have been developed with the focus on the impact of what the money buys, rather than the level of spending (Rice and Schwartz, 2008). In this regard, teacher qualifications, class size, and teacher salaries are considered to be typical school inputs in the education production function. However, previous research on the effect of schooling inputs does not agree on whether and how much they have an impact on student performance. These inconclusive results come from disagreement about the empirical specification, due to the requirements of the huge data set.

3.3 Interaction between family and school

When considering parental investment in private tutoring in terms of parental decision-making, it is necessary to look at how parents respond to the external environment. One strand of research, which looks at interactions between schooling inputs and parental investments, notes that parents respond to schooling inputs based on whether parental inputs and schooling inputs are substitutes or complements. For example, parents will invest more in a child's education in response to an increase of school inputs if parental and schooling inputs are complements, and parental inputs will increase as schooling inputs decrease if they are substitutes (Bonesronning, 2004; Datar and Mason, 2008).

Some of the past literature has examined how parental inputs respond to schooling inputs. Datar and Mason (2008) tested the causal effects of class size on three types of parental involvement parentally financed activities for children, parent-school interaction and parent-child interaction. They found that increases in class size are more likely to reduce parent-child interactions and increase parental financial investments in a child, but do not have any effect on parent-school interaction. In a similar context, Bonesronning (2004) showed that parental involvement, measured by help with homework and subject-related discussions, are reduced as class size increases.

Private tutoring could be regarded as parental involvement in education in the form of financial activity. Previous research on the demand for private tutoring illuminated possible underlying factors driving that demand. A market response to a poor quality of public education, meaning circumstances such as large classes and low public expenditures, is one of the significant reasons for a high demand on private tutoring (e.g., Glewwe & Kremer, 2006;

Kim & Lee, 2004). Considering that private tutoring is a common practice in East Asia, high competition to enter college is detrimental to cultural differences in education (e.g., Bray, 1999; Bray & Kowk, 2003; Biswal, 1999; Buchmann, 1999). Furthermore, the corruption of individual teachers in schools could affect private tutoring (e.g., Biswal, 1999; Buchmann, 1999); that is, in developing countries, due to low salaries, some teachers might make extra income by requiring students to take private tutoring classes from them. In addition, many previous studies confirm that family income is the critical factor in deciding the level of household investment in private tutoring, whether it is highly inelastic, as in Greece (Psacharopoulous & Papakonstantinou, 2005), or elastic, as in Turkey (Tansel & Bircan, 2006).

        Our understanding of private tutoring practices has grown increasingly imbalanced. Empirical research, especially, has lagged behind in three important ways. First, even with a growing interest in private tutoring practices, there are relatively fewer quantitative studies to analyze their determinants and impact (e.g., Dang, 2008). Furthermore, the unit of analysis in most of the studies does not represent the national population and, thus, might generate selection bias. Finally, many research studies consider the possible endogenity issue in the model and inadvertently mishandle this issue (e.g., Ha & Harpham, 2005). This leads to biased estimates in the models.

3.4 Theoretical Framework

        This paper begins to set up a theoretical model by following Becker's interdependent preference assumptions that parents maximize their utility, which is influenced by their own consumption (Cp) and their children's quality (Q) representing students' school performance for one period. It proposes that parents' maximizing behaviors are explained by their consumption and by their children's school performance:

$$Max = U(C_p, Q) \qquad (6)$$
$$Q = f(G, F, S, e, E_p) \qquad (7)$$
$$A(1 - \tau_a) + I(1 - \tau_i) = C_p + PE_p \qquad (8).$$

        The household's utility function is constrained by its budget (6) and education production function (2). Equation (2) represents the education production function, where S represents a vector of school characteristics; F is a vector of student, family, and neighbor characteristics; N represents physical factors such as enrollment size; e represents other unobserved variables such as productive efficiency; and Ep signifies the cost of private tutoring. Equation (3) shows the budget constraints, where A represents other household income, I indicates household income, and τ_a and τ_i indicate the government income tax and non-labor income tax, and the price of Cp is normalized to 1. Using the Lagrange function, we get equation (4):

$$\mathcal{L} = U(C_p, Q) + \lambda(A(1 - \tau_a) + I(1 - \tau_i) - C_p - PE_p) \ . \qquad (9)$$

We obtain the following first-order conditions from the optimization problem.

$$U_{c_p} = \lambda \qquad (10)$$
$$U_Q \frac{\partial Q}{\partial E_p} = \lambda P \qquad (11)$$

From equations (5) and (6), we derive the following equilibrium condition:

$$\frac{U_{c_p}}{U_Q \frac{\partial Q}{\partial E_p}} = \frac{1}{P} \qquad (12)$$

        Equation (7) explains that the marginal utility from a one-unit increase in parental consumption equals the marginal utility of the unit improvement of their child's performance achieved by the amount of the parents' expenditure and the marginal effect of private tutoring on student performance. From this result, the demand function for private tutoring is derived:

$$E_p = f(I, A, G, F, S, \tau_i, \tau_a, e) \ .$$

        The demand function for private tutoring shows that the demand is affected by family characteristics as well as by community or policy factors.

4. Data and Methods

4.1 Data

        This paper employs data from the Korean Education & Employment Panel (KEEP),[3] which is the first panel study in the Korean educational context. A total of 6,000 students from a sample of 9th and 12th graders were first surveyed in 2004, and respondents were resurveyed in 2005, 2006, and 2007. Each student reported on a wide range of questions; school, work and home experiences; educational resources and support; and educational and personal aspirations. The panel study also surveyed parents, teachers, and school administrators, in order to establish a comprehensive data set. Each student was matched with his or her household, school and school administrators. Parents reported on a wide range of topics, such as household income, expenditures, education, and their relationship with students. At each level, information about the school environment and teacher characteristics was provided. The sampling method consisted of stratified cluster sampling, with adjustments for missing data.

4.2 Methods

Based on the previous conceptual framework, the basic empirical model can be provided by the following equation:

$$Y_{igt} = \beta_0 + \beta_1 F_{igt} + \beta_2 SC_{igt} + \beta_3 ST_{igt} + \beta_4 E + \varepsilon_{igt} \ , \qquad\qquad (13)$$

where Y is the total household expenditures on private tutoring for individual i in grade g at time t; F is the vector of family characteristics for individual i in grade g at time t; SC is the vector of school input; ST is the vector of student characteristics; E is the vector of school efficiency determinants; and e is the error term in the model.

Dependent variable

Measuring a dependent variable as total household expenditures on private tutoring in the model involves censoring bias, because it does not reflect the variation when expenditures on private tutoring equal zero.Since the estimates from OLS are biased due to censored data, this paper uses a Tobit model. However, Deaton (1997) argues that the Tobit model used in household consumption surveys often generates inconsistent estimates due to a heteroskedasticity issue across income levels.[4]

Independent variables

Variables for family characteristics include household expenditures, family structure, the gender of the child, birth order, the education of the parents and the number of siblings. Because total household expenditures are a more representative variable than household income in the household survey due to less measurement errors in expenditure and more accurate for permanent income, household expenditures are employed as a proxy variable for the income of a family in the model (Liviatan, 1961; Strauss and Thomas, 1995; Tansel and Bircan, 2006). Family structure is also considered a significant variable in the investment in a child's education. It was recorded as dummy variables relating to whether or not parents co-reside with the child (Han, Huang, and Garfinkel, 2003). A great number of studies draw attention to the impact on investment in child quality made by the number of children in a family (Hanushek, 1992), birth order and gender differences (Alderman and King, 1998). Thus, the number of children and birth order were added as continuous variables, and the gender of the child was added as a dummy variable to the model.

School input in the model includes the teacher-to-pupil ratio, teacher evaluation, relation between teachers and students, and class size. With regard to teacher evaluation[5], students are asked about the performance of teachers in each subject, such as math, reading, and English, ranging from most effective to least effective. The variable of teacher evaluation is constructed by a composite index, adding each individual evaluation. Given that most students receive private tutoring on three major subjects, this variable can represent the teacher quality for a given specific school. In addition, a set of factors causing inefficiency in schools was added to the model, such as the equalization policy, class-tracking policy, the number of teachers in the union among total teachers, and evaluation of the local school council.

The equalization policy was recorded as a dummy variable that was coded 1 if a school fell under the policy, and otherwise as 0. Whether explicit tracking policies within a school exist or not was added as the dummy variable. The strong union at a school is considered to be constraints that impede the autonomous school decision making process.The strength of union is measured as the ratio of teachers in the union among total teachers. The activity of local school council in a school shows how parents and local residents involve in the school management process, thus reflecting the degree of monitoring activity by people from outside school. Moreover, parents with information about private tutoring are more likely spend on private tutoring; thus, this paper employs population size as proxy variable representing information about and access to private tutoring. Table 3 presents a detailed explanation of the independent and dependent variables employed in this model.

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[4] To circumvent a heteroskedasticity problem, this paper uses a natural logarithm of dependent variable. As a result of taking the logarithm, the significant amount of observations could be dropped because private tutoring expenditures are censored at zero. Thus, this paper replaces a zero with one for private tutoring expenditures (e.g. Tansel and Bircan, 2006).

[5]Teacher evaluation by students is not available in 2004 survey. Thus, in the analysis of 2004 data, teacher evaluation variable is used as evaluations by administrators and teachers on other teachers.

[Table 3] Descriptions of Variables

Variables	Descriptions
Per Child Expenditure on Private Tutoring	Monthly spending on private tutoring for one child
Total household expenditure	Monthly expenditure of household
Father's education	The Father's education is recoded as 1 = did not go to school, 2= elementary school, 3 = middle school, 4=high school, 5=college (2-3yrs), 6= university, 7= graduate school (master), 8=graduate school(doctoral)
Mother's education	Mother's education. The category of the level of education is the same as the father
Number of Children	Number of Child
Birth Order	Birth order, for example recode 1 if student is the first child and 2 if student is the second child at home
Gender	1 if student is male
Tracking Policies	1 if a school has tracking policies
Equalization Policy	1 if a school is not under equalization policy
Co residence with parents	1 if student live with parents
Metropolitan areas	Population size is categorized into five areas; for example,1 = metropolitan, 5 = rural area
Class rank	Class rank reflects how the students' performances can be ranked among total student at the same grade
Evaluation of local school council	Teacher evaluation on the operation of local school council which is asked in a likert scale
Neighboring wealth	Teacher evaluation on household's wealth which is asked in a likert scale
Class size	Total students divided by the number of class
Ratio of teachers in union at school	The number of teachers in the union among total teachers at a school
Teacher per pupil	Total students divided by the number of teachers
Relation between students and teachers	Teacher and administrator's evaluation on relation between students and teachers at a school which was asked in a likert scale (e.g. 1= very bad, 5=very good)
Teacher Quality	Teacher and administrator's evaluation on teacher quality at a school which was asked in a likert scale (e.g. 1=very bad, 5=very good)
Student evaluation on tutoring	Student evaluation on tutoring which is asked about how much private tutoring is helpful in a likert scale

The most challenging part of the empirical model is the bias resulting from the fact that parental involvements are endogenous to student performance, peer effects and school resources. First, student achievement affects the household decision-making process, which in turn has an influence on student performance. However, students test scores were only provided for 12th grade students, as a result of the nation-wide college examination; thus, variables about previous student test scores are not available. Instead, the panel study asked teachers to rank students in each grade level, based on student performance. Parents would react to the ranking of students by class rather than the test scores, because it is much easier for parents to understand overall student performance. This paper tries to eliminate bias by ranking students in three categories: high, average and low.

This allows us to investigate the effects of student performance on spending for private tutoring, but student performance, recorded as one of the three categories, could not be affected by the private tutoring, because three categories are large enough that students could not alter their ranking through private tutoring.

Second, peer group characteristics on spending for private tutoring might affect parents' investmentin a child's tutoring, but parents' spending, in turn, are influencedby other parental investments. In this model, a proxy variable representing peer characteristics of spending on private tutoring is introduced: teacher' evaluation of average parental income. However, Hoxby (2000) provides evidence that sorting in schools takes place within school districts, so that parents' selection of a place of residence can affect peer group characteristics. Even in Korean educational settings, where students are randomly assigned to each school, sorting is likely to take place, because parents choose to reside in regions with better school districts. Past studies have exploited natural experiments, where students are randomly assigned to peer groups (Sacerdote, 2001), or fixed-effect techniques focusing on student level or school or grade level (Hanushek et al., 2003; Vigdor and Nechyba, 2006). Because fixed effect model in the tobit model generate the bias of the coefficients (Greene, 2004), this study employed the random-effect technique.

Third, somestudies analyzing the interaction of parents with class size address the bias of reverse causality. However, given that students are randomly assigned to each school under the equalization policy, parental choices in schools are relatively restricted. Even in environments where the equalization policy does not exist, the reverse causal relationship is limited because a school chooses students, rather than parents and students choosing a school. Thus, this paper is based on the following formula:

$$Y_{igt} = \beta_0 + \beta_1 F_{igt} + \beta_2 SC_{igt} + \beta_2 TS_{igt-1} + \beta_3 ST_{igt} + \beta_4 E + u_{igt} + \varepsilon_{igt} \ ,$$

where Y is the total household expenditures on private tutoring for individual i in grade g at time t; F is the vector of family characteristics for individual i in grade g at time t; SC is the vector of school input; ST is the vector of student characteristics; TS is the class rank for the student at time t-1; E is the vector of school efficiency determinants; u is the child effect; and e is the error term in the model.

5. Result

Table 4 indicates the result of the Tobit estimate for 2004[6]. The coefficient of the logarithm of total household expenditures is 1.710, which shows the elasticity of expenditures to private tutoring. It is also statistically significant at the 1 percent level. The father's and mother's educations are positively related to expenditures on private tutoring, but were not statistically significant. As expected, the number of children negatively affects spending on private tutoring, which is statistically significant at the one percent level.

In Table 4, the effect of birth order shows that parents are more likely to invest in the first child rather than the second or third. This concurs with previous studies that birth order is one of the factors to measure for parental investment. However, gender is not perceived to be a factor in Korea, unlike in other developing countries. Whether or not students reside with parents also strongly affects spending on private tutoring and is statistically significant. Interestingly, students with higher performance are more likely to receive private tutoring. Also, if students consider private tutoring to help with their studies, parents are more likely to invest in it.

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[6] Household costs for private tutoring for 2004 were drawn from the panel survey in 2005. Thus, the available panel data actually runs from 2004 to 2006 because of the time-lagged variable of private tutoring costs. In addition, some questionnaires in the first wave were changed in next wave of as respondents (students) moved to high school from from middle school. To be consistent with independent variables in the model, this study divides it into Model 1 for 2004 and Model 2 for 2005 and 2006. This study only shows the results of Model 1 due to limited access to some of the variables in the data.

[Table 4]

DV: Log (Total household expenditure)			
	Coefficient	S.E.	P value
Father's education	1.710	0.140	0.000
Mother's education	0.102	0.070	0.146
Number of Children	0.076	0.082	0.358
Birth Order	-0.477	0.115	0.000
Gender	-0.444	0.108	0.000
Traking Policies	0.052	0.126	0.680
Equalization Policy	-0.300	0.133	0.024
Co residence with parents	0.657	0.197	0.001
Metropolitan areas	1.220	0.992	0.219
Class rank	-0.174	0.097	0.074
Evaluation of local school council	-0.295	0.079	0.000
Neighboring wealth	0.017	0.140	0.903
Class size	0.077	0.090	0.389
Ratio of teachers in union at school	0.031	0.033	0.351
Teacher per pupil	-1.199	0.382	0.002
Relation between students and teachers	-0.063	0.041	0.124
Teacher Quality	0.111	0.135	0.412
Student evaluation on tutoring	-0.142	0.179	0.427
N	1321		

In the model, school characteristics are an indicator of whether parental investment increases in response to school inputs. As a measure of inefficiency, tracking policies at a school negatively affect spending on private tutoring, evidence that parental investment in private tutoring is a result of a uniform level of services that a school provides. Another characteristic of inefficiency is the central government's equalization policy; parents invest less in private tutoring under this policy. Considering that students in the survey for 2004 were in the ninth grade, they faced more competition than those under an equalization policy, because they had to compete against each other in order to get into more prestigious high schools. Thus, this direction of the effect of an equalization policy is applicable only to students in the ninth grade. In order to gauge the general effects of the equalization policy, this result should be compared with results from the sample of students in high school.

The wealth of neighboring parents shows that parental investment in private tutoring is influenced by peer effects among parents. The result indicates that parents tend to invest more in tutoring when other parents from their school do it. Living in a metropolitan area is an indicator of the population size, as well as the access to information about, and facilities for, private tutoring. It explains that parents with more information about tutoring are inclined to invest more. The effects of some school input variables provide a contrasting view from the existing literature. First, students with more teachers in a school union are less likely to receive tutoring, which contradicts the assumption that a union can be one factor to cause school inefficiency. Second, the effects of class size and the pupil-to-teacher ratio have different directions.

Third, teachers' and administrators' evaluations of the local school council positively affect spending on private tutoring. This result might come from the simultaneity problem that parents with more investment in tutoring will be more willing to volunteer to work in a council. These contrasting results could imply that the simultaneity bias is not completely cleared in this model. Tobit estimates with random effect in the panel structure could offer more detailed account of family behaviors on private tutoring consumption.   Good relations with teachers and students at a school are positively related to spending on private tutoring, while high teacher quality leads to reduced spending on private tutoring. It captures the fact that spending on private tutoring substitutes for the quality of the school.

6. Contributions

This paper contributes to an understanding of the interaction between schools and parents, by exploring the determinants of private tutoring expenditures in Korea. In the contexts of education and psychological motives, it narrows down the issue to show that teachers may be able to enlist more parental effort and involvement. It clearly indicates that more investigations of the relationship between parents and schools are required. This study provides another investigation of parental responses to the external environment. Second, it provides implications for policy makers regarding the Korean equalization policy. There has been a lot of discussion on whether the Korean administration should drop or expand its equalization policy. Some researchers argue that the high demand for private tutoring results from the unsatisfactory quality of public education under the equalization policy (Kim and Lee, 2004). Thus, in order to reduce private tutoring practices, we should drop the equalization policy and differentiate the level of educational service in public as well as private schools. Meanwhile, supporters of the equalization policy argue that dropping the policy could spur more demand for private tutoring in a highly competitive environment. For example, supporters point out that, as the current popularity of independent private schools spurs private tutoring practices to prepare students for particular schools, dropping the equalization policy would still create a high demand for private tutoring.

Future research should incorporate a variety of parental decisions in the modified Becker model. Expanding the scope of analysis of parental decisions to situations such as caring for children and sending them to private school could clarify the underlying dynamics of family behavior in educational contexts, and explain family behavior in response to current educational reforms. Eventually, the true value of the impact of reforms on student performance could be gleaned from a solid understanding of the interactions between schools and parents.

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