THE ESTIMATION OF INTERNAL RATE OF RETURN TO 4-YEAR UNIVERSITY EDUCATION IN SOUTH KOREA TAKING PRIVATE TUTORING COST INTO ACCOUNT

By

KWON, Sungoh

THESIS

Submitted to
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Committee in charge:

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ABSTRACT

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In the past three decades, higher education in South Korea has been rapidly expanding, which has aroused controversy on whether such a large amount of investment can be justifiable from the perspective of the economy as a whole. This study provides empirical evidence on this issue by estimating an internal rate of return to 4-year university education in South Korea. In particular, unlike previous studies, a part of private tutoring cost is included as the cost for university education. Without considering this part, a real internal rate of return is measured at 2.29% in male and 2.56% in female. The estimates including the private tutoring cost vary from 0.66% to 1.64%. Considering annualized real returns on 3-year government bonds (2.10%) and 10-year government bonds (2.76%) from 2001 to 2011, the investment on university education is less lucrative than alternative investments. In spite of methodological limitations, it is still obvious that private tutoring expenditures remarkably decrease the rate of return to university education, and thus, the government should take extensive measures to discourage exorbitant private tutoring for going to university.

Key words: Internal rate of return to university education, private tutoring cost

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I. INTRODUCTION

In the past three decades, higher education in South Korea has been rapidly expanding.[1] Entry rates in higher education have increased from 27.2% in 1980 to 72.5% in 2011,[2] and the recent levels since 2006 have been even higher than the average levels of OECD countries.[3] Many researchers have argued that the enthusiasm for education is a key success factor of Korean miracle because it has contributed to accumulation of human capital.[4]

Now though, it is considered as a social problem in South Korea. Given the high entry rates in higher education, people cast a doubt on the benefits of the education because it seems just a signaling for a better job and other opportunities, rather than the investment in human capital which leads to increase in productivity. According to a recent study from Samsung Economic Research Institute (SERI), higher education is a prerequisite for success in South Korea. The report shows that high school graduates face relatively higher unemployment rate, lower wage, and poorer working conditions than college graduates.[5]

A huge amount of national resources used for higher education is also a target of criticism. OECD reports that expenditure on tertiary educational institutions in South Korea as a percentage of GDP in 2008 is 2.6% which is much higher than the average level of

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[1] According to Korea Educational Development Institute, higher education institution includes junior college, university of education, university, miscellaneous school (courses for junior college and university), air and correspondence university, industrial university, and polytechnic college.

[2] Korea Educational Development Institute, *Brief statistics on Korean education*, 2011, 14.

[3] OECD, *Education at a glance*, 2011, 308.

[4] Maw-Lin Lee, Ben-Chieh Liu, and Ping Wang, "Education, human capital enhancement and economic development: Comparison between Korea and Taiwan," *Economics of Education Review*, vol.13, no. 4 (1994):275-288.

[5] Samsung Economic Research Institute, *Daehage Gaji Anado Sunggonghanun Sesang (A world where high school graduates can succeed)*, 2012, 4-7

OECD countries, 1.5%.[6] According to SERI, taking into consideration forgone earnings and expenditures for private tutoring during the school-age years increases it up to 3.2% of GDP.[7]

Nevertheless, the mere fact that most of people go to college may not be a problem. Even if a college graduate works as a cleaner, we cannot say the investment in education is inefficient if his or her productivity is much higher than other cleaners so that it can compensate for the cost of education. In this sense, empirical evidence considering both benefits and costs of higher education is necessary. It can provide a guideline for the government as to whether it should encourage or discourage the huge investment from the perspective of economy as a whole.

Although empirical studies on the social returns to higher education have been accumulated, they do not take into account the cost for private tutoring for a university entrance exam, in spite of its association and considerable amount. The view that considers the private tutoring expenses as the cost for going to university is based on game theory approach on the issue. According to Ji-ha Kim and Il-woo Paik[8], Korean parents strategically decide whether they consume private education service or not, with the aim of sending their children to one of prestigious universities. Based on estimated payoff matrix of private tutoring game, the authors argue that the typical non-cooperative game, prisoners' dilemma game model, is suitable for explaining the parents' rational but wasteful consumption behavior.

Of course, not all the expenditure on private tutoring can be defined as the cost for a university education. Nevertheless, if it is exaggerated owing to the highly competitive circumstances for going to university, the inflated part should be categorized as the cost of a

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[6] OECD, *Education at a glance*, 2011, 231.

[7] Samsung Economic Research Institute, *Daehage Gaji Anado Sunggonghanun Sesang (A world where high school graduates can succeed)*, 2012, 3

[8] Ji-ha Kim and Il-woo Paik, "Analysis of Demand for Private Tutoring on the Basis of Game Theory," *The Journal of economics and finance of education*, Vol.15, no.1 (2006), 210.

university education because parents would not spend the money without the purpose. Therefore, the main purpose of this paper is filling the gap by estimating a social internal rate of return to university education with the consideration of private tutoring cost during the school ages. In particular, this study focuses on only 4-year university (university) which accounts for the biggest portion of higher education in terms of the number of institutions and students.[9]

In chapter 2, there are theoretical backgrounds and literature reviews on the rate of return to education. Chapter 3 estimates an internal rate of return to university education considering private tutoring cost. The result casts a doubt on the investment in university education. Implications are suggested in chapter 4.

[9] Korea Educational Development Institute, *Brief statistics on Korean education*, 2011, 21.

II. Theoretical background and literature review

II-1. Benefit of education

The first thing that comes to mind when we think of the benefit of education is the additional earnings. However, there are non-monetary returns of education as well. People obtain satisfaction from educational process itself in the form of intellectual delight. In addition, those who have received advanced levels of education are more likely to move up in social standing and even have higher chances to marry a better spouse.[10] According to Blanchflower and Oswald, holding everything including income constant, education is associated with not only job satisfaction but also overall life satisfaction.[11]

From the social perspective, a wide range of external benefits also should be taken into consideration.[12] Knowledge spillover is a case in point. It arises when education increases not only the productivity of those receiving the education but also the productivity of people whom they work with and interact with. This external gain is possible through the exchange of ideas, imitation, and learning-by-doing. Bynner and Egerton argue that participation in higher education is related with participation in political activities, community affairs, and voluntary work. More broadly, it has a positive impact on social cohesion by transmitting attitudes and values in the society.[13]

Although non-monetary returns and external benefits should also be included when

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[10] G. S. Becker, "A Theory of Marriage," *Journal of Political Economy*, no. 81 (1973): 813.

[11] David Blanchflower and Andrew Oswald, "Wellbeing over Time in Britain and the USA." (working paper presented at the National Bureau of Economic Research Summer Workshop, Cambridge Mass, July 2000).

[12] N. Barr, "The benefits of education: What we know and what we don't." (paper presented at HM Treasury seminar held at 11 Downing Street, October 2000).

[13] John Bynner and Muriel Egerton, "The Wider Benefits of Higher Education." Wider Benefits of Learning Research Centre, London: Institute of Education, for the Higher Education Funding Council for England in association with the Smith Institute. 2000.

estimating the rate of return to education, it's greatly difficult due to the measurement problems. In this paper, only increase in income by getting additional education is considered as the benefit of education.

II-2. Cost of education

The total cost of education refers to the all forms of expenses spent for education activities, either directly or indirectly. Since Korea Educational Development Institute (KEDI) categorized the educational expenditure of South Korea in 1977, the classification has been used in many previous studies and this study also follows them. As suggested in the figure1, cost of education consists of direct educational cost and indirect educational cost.

According to KEDI[14], direct cost is all expenses that are directly paid to education activities such as payments for teachers and tuition fees. On the contrary, indirect cost, or educational opportunity cost, is the expenses that cannot be directly charged to education, but should be abandoned. A typical example is the value of the student's time, typically measured as earnings foregone. This is the cost for education because a student would be able to earn money or perform other activities if he or she were not spending time in studying.

Direct educational cost is divided into public and private education expenditure. While OECD's classification depends on which part covers the cost, KEDI's one is based on whether the educational expenditure is conducted through public accounting procedures or not.[15] For instance, even if parents pay the tuition fees, they are included in the public education expenditure in KEDI's classification because educational institutions lastly spend them through public accounting procedures. On the contrary, the cost for school supplies and private tutoring are classified as private education expenditure because individual pays the cost not through public accounting.

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[14] Korea Educational Development Institute, Daehakui *Kyoyukbiwa Suiklyul Bunsok Yongu (Educational expenditure and rates of return to higher education)*, 2008, 24.

[15] KEDI, *Educational expenditure and rates of return to higher education*, 25-26.

Public education expenditure is composed of those that government covers and those that parents do. Public education expenditure covered by the public sector is funded by a grant and surplus from the national government, transferred money from a local government or incorporated educational institution, and contribution donated by other social and private organizations.[16] Public education expenditure covered by the private sector consists of admission fees, tuition fees, and school support fees.

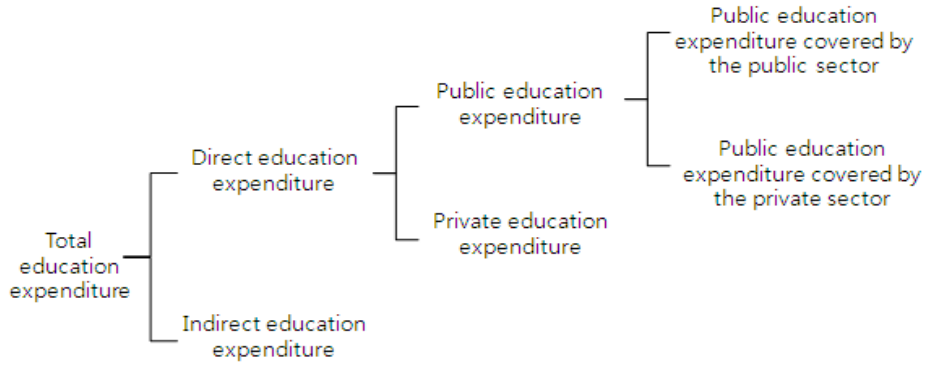

Figure 1. The classification of educational cost in South Korea, from KEDI, *A study on cost and rate of return of university education*, 2008, 24.

II-3. Return to education

The internal rate of return approach and the earning function approach are two major methods to estimate the economic value of investment in education even if there are other approaches such as net present value and the production function approach. Until the 1960s, the internal rate of return approach had been the most frequently used; nonetheless, since Jacob Mincer published his landmark book, *Schooling, Experience, and Earnings* in 1974, far much of studies have adopted the earning function approach.[17]

The most compelling advantage of the method is that diverse factors which affect people's income level can be controlled, so that the benefit of education is more precisely

[16] Il-u Baek, *Education Economics*. (Hakjisa, 2007), 148.
[17] Sherwin Rosen, "Distinguished Fellow: Mincering Labor Economics," *Journal of Economic Perspective*, no 6 (1992): 157.

identified. In addition, since the method ignores the direct cost of education, we can avoid errors from directly calculating the cost. However, it causes a serious problem in the case of South Korea because direct educational costs are not negligible.[18] If the return to education is measured through Mincer equation, it would be overestimated. In this sense, the internal rate of return approach better matches the purpose of this study because it includes both direct and indirect costs of education, allowing us to estimate the social rate of return to education.

Empirical studies on the rate of return to education have been accumulated widely since 1960s. In particular, Psacharopoulos have selected data of many countries and presented their rates of return to education for 30 years. The most recent results are briefly summed up as in *Returns to Investment in Education: A Further Update*.

The studies using the internal rate of return approach in South Korea can be summarized as follows. In 1978, Jongun Bae chose the method to estimate social rate of return to education using one year cross-sectional data.[19] Seil Bark estimates both individual and social internal rate of return to education by sex and level of schooling.[20] Studies conducted by KEDI in 1985 and 1994 investigated the private education expenditure at first-hand and calculated the internal rate of return.[21] They are also significant in the sense that they firstly reflect survival, activity, and unemployment rates when using income data. Kim and Moon use *Korea Economically Active Population Additional Survey* from Korea National

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[18] In table 1, the direct cost of university education is even larger than the indirect cost.

[19] Jongun Bae, *Kyoyuktoojaui Jokjeonhwawa Kyoungjaejuk hyokwae Gwanhan Yeongu (A study on rationalization and economic effect of educational investment*), *Moonkyoboohaksoolyeongujosung Yeongubogoseo*, 1978.

[20] Seil Bark, "*Urinara Kyoyuksooikryul Boonsuk* (Rate of return to education in South Korea)", *Hankookgaebalyeongu*, no.4(3) (1982), 94.

[21] Eunbae Gong, Taejung Kang, and Yugyeong Han, "*Kyoyuktoojakyumowa sooikryul* (The size of educational investment and rate of return to education)," *Korea Educational Development Institute*, 1985.

Eunbae Gong and Seongjun Baek, "*Hanguk gyoyuktujaui siltewa sooikryul boonsuke gwanhan yeongu*" (A reality of educational investment and rate of return to education in South Korea)," Korea Educational Development Institute, 1994.

Statistical Office (KNSO) which does not require such an adjustment.[22] The most recent report on educational expenses from KEDI in 2008 has a distinct characteristic that it targets on only 4-year university level while others deal with all the schooling level. It conducted survey on private education of university students with a larger number of sample size, superior sample design, and higher return rates for a questionnaire than any previous surveys.[23] As mentioned above, however, none of these studies take into account private tutoring cost for a university entrance exam, and all of them support the investment in university education.

[22] Honggyun Kim and Yongho Moon, "The Estimation of Internal Rate of Return to Schooling in Korea: 2000~2005," *Journal of Korean Economy*, no 18 (2007): 237-269.

[23] KEDI, Educational expenditure and rates of return to higher education, 2008.

III. Estimation of internal rate of return to university education

This chapter suggests the internal rate of return to university education in South Korea by calculating lifelong benefits and costs per student.

III-1. Estimation of benefit of university education

In this study, benefit of university education is defined as additional income that university graduates make compared to high school graduates. Conceptually, however, it would be not accurate to compare lifetime earnings of two groups of people. Considering that students who perform well in school are more likely to go to university, the gap in lifetime earnings may result from not only the university education but also the difference in their abilities. Nevertheless, this study cannot overcome this problem.[24]

In order to precisely measure the additional income, we need longitudinal panel survey for over 40 years given the assumption that generally people work by age 65. However, there is little such data even in advanced countries; thus, most previous studies utilize cross-section data with large sample size and so does this study.[25] The problems by using cross-sectional age earning profile are as follows. First of all, it cannot reflect wage increases due to the rise in productivity. To illustrate, when utilizing cross-section data, income level that 30-year-old workers will receive after 20 years is calculated by using data of currently 50-year old men. It is clear that the former would be bigger than the latter

[24] In order to eliminate this ability effect, researchers have tried to diverse methods; for instance, Ashenfelter and Krueger, Ashenfelter and Rouse used earning difference of identical twins with an assumption that their inherent abilities were equal.

[25] The U.S. has *Panel Study of Income Dynamics (PSID)* which is the world's longest running household panel survey from 1968.

because of productivity growth.[26] On top of that, yearly-specific factor including business fluctuations cannot be controlled.

Although a large portion of previous studies used *Wage Structure Survey* from Ministry of Labor; this study utilizes *Korea Economically Active Population Additional Survey* from KNSO.[27] It is based on seventy thousands individuals, which is bigger sample size than any other data set in South Korea.[28] This is important because when the data is divided by age, sex, and the level of education, it could be possible that some specific groups have small sample size, which its average value might not be representative. Furthermore, while *Wage Structure Survey* includes only regular employees, *Korea Economically Active Population Additional Survey* has both economically and not economically active population including regular workers, temporary workers, and the unemployed.[29] If only regular employees are included, the averages income would be overestimated. Of course, most of previous studies utilizing *Wage Structure Survey* deflated wages by applying activity rate, employment rate, and survival rate. However, this complicated adjustment process is unnecessary when using *Korea Economically Active Population Additional Survey*.[30]

Differences in average annual income between high school graduates and university graduates are suggested in table 1. They are calculated using weighted average value of the survey data from 2001 to 2008. The GDP deflator from the Bank of Korea is used for making them constant in 2008. The differences show a clear growing trend until the age of 56-60 in male and 51-55 in female, and it is reversed after then.

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[26] Kim and Moon, "The Estimation of Internal Rate of Return to Schooling in Korea," 244.
[27] The raw data can be obtained in Micro Data Service System (http://mdss.kostat.go.kr).
[28] KEDI, *Educational expenditure and rates of return to higher education*, 172.
[29] Kim and Moon, "The Estimation of Internal Rate of Return to Schooling in Korea," 239.
[30] KEDI, *Educational expenditure and rates of return to higher education*, 172.

Table 1. Difference in Average Annual Income between High School and University Graduates

(Unit: Won)

	Male			Female		
Age	High school	University	Difference	High school	University	Difference
18-21	8,914,810		-8,914,810	9,589,436		-9,589,436
22-25	12,414,757	10,942,935	-1,471,822	11,734,382	13,050,569	1,316,187
26-30	16,061,117	19,568,240	3,507,123	12,405,262	17,740,004	5,334,742
31-35	19,394,418	26,578,977	7,184,559	11,633,956	20,105,913	8,471,957
36-40	21,962,920	31,097,497	9,134,577	11,557,255	20,678,881	9,121,626
41-45	23,507,430	35,244,161	11,736,731	12,255,853	22,123,743	9,867,890
46-50	25,377,619	38,685,029	13,307,410	12,888,580	24,979,069	12,090,489
51-55	25,593,305	40,288,647	14,695,342	12,051,111	25,645,433	13,594,322
56-60	19,079,838	33,905,895	14,826,057	10,967,810	22,175,326	11,207,516
61-65	13,364,049	24,055,217	10,691,168	9,000,028	13,467,016	4,466,988

Source: KEDI, *Educational expenditure and rates of return to higher education*, 359-362.

III-2. Estimation of cost of university education

The costs of 4-year university education including private expenditure for university entrance exam are summarized in table1 according to the aforementioned classification.

Table 2. Summary of the Cost of University Education per Year

(Unit: Won)

Direct educational cost	Public educational cost		11,217,000
	Private educational cost		3,386,690
Indirect educational cost	Foregone earnings (18)		7,747,780
	Foregone earnings (19)		8,931,039
	Foregone earnings (20)		9,762,935
	Foregone earnings (21)		10,402,246
Private tutoring cost for a college entrance examination	Preparation for a college entrance examination	Elementary school	676,105
		Middle school	1,401,453
		High school	2,342,604
	Preparation for a college entrance examination Study in advance	Elementary school	2,036,019
		Middle school	2,664,481
		High school	2,657,262
	Preparation for a college entrance examination Anxiety Study in advance Makeup for classes	Elementary school	2,900,562
		Middle school	3,383,051
		High school	2,893,099
	Private tutoring cost for retaking a college entrance examination		5,710,200

1) Public education expenditure

Public education expenditure is all expenses that are put into education activities through public budget and accounting proceedings. They are financed by the national and local government, incorporated educational institutions, social and private organizations, and students and their parents. Since they are spent by due process of law, their size can be estimated readily and precisely.

Public education expenditure per student has been provided by KEDI. This study uses survey in 2008 which provides more accurate estimation than previous studies.[31] First, the survey excludes students on temporary leave for precisely estimating the costs per student while others are based on the whole students on the register. On top of that, this study excludes the Industry - University Collaboration accounts because it primarily consists of research expenses which are not intended for undergraduate school students.

2) Private education expenditure

It's difficult to accurately estimate private education expenditure because the data depends on the reports from students and their parents. For a university level, previous researches have used survey data from KEDI. However, before 2008, the surveys were based on less than one thousand samples, and lists of items in the survey were not proper to investigate private education expenses of university students. Some items such as boarding expenses and transportation expenses accounting for over 40% of private education expenditure are not included.

The most recent published report in 2008 is superior in terms of the number of sample size, completeness of items, and sample design.[32] Among 1,330,080 students in 174 4-year universities, the survey sampled 7,893 students in 50 universities, considering the representativeness of sample. The sample universities and students were selected in proportion to the characteristics of the population distribution such as location and size of universities as well as students' majors, sex, and grade. The survey items are well-organized that reflect the distinct features of university students' private education expenditure.

[31] KEDI, *Educational expenditure and rates of return to higher education*, 77.
[32] Ibid., 10-18.

3) Indirect education expenditure

Indirect costs are expenses that cannot be directly charged to education, but should be abandoned. A typical example is the value of student's time, typically measured as earnings foregone. This is the cost for education because a student can earn money if he or she were not spending time on studying. Indirect costs include not only forgone earnings but also tax benefits given to universities, costs generated by not using educational facilities for other economical purposes, depreciation expense of the facilities, and so on; nevertheless, this study does not include them due to the limitation of data.[33]

Korea Economically Active Population Additional Survey in 2008 is used to estimate earnings foregone during university years.[34] Originally, it should be calculated using the earnings that university students would be able to make if they did not go to university. However, since it is impossible, the earnings that high school graduates make from 18 to 21 years of age are used. It might be underestimated due to the difference in ability between high school graduates and university graduates. In addition, although students take time off from school, especially for military services in South Korea, this study assumes that students receive a university education from ages 18 to 21 year due to the lack of data.

4) Private tutoring cost for a college entrance examination

Although not all the private tutoring cost before entering a university can be defined as the cost for a university education, it's clear that parents would not pay the entire costs, 12.5% of household income for two children,[35] if their children don't plan to go to university. Indeed, 73% of high school parents, which is similar to the college entrance rate, said the purpose of their expenditures in private tutoring was preparation for a university entrance

[33] Il-u Baek, *Education Economics*. (Hakjisa, 2007), 148.

[34] The raw data can be obtained in Micro Data Service System (http://mdss.kostat.go.kr).

[35] Samsung Economic Research Institute, *A world where high school graduates can succeed*, 2012, 3

examination.[36] It's much clearer when taking into account evidence from panel data, Korean Education & Employment Panel Survey (KEEP). According to the data from 2005 to 2007, high school students answering that they would not go to university spent just 5~7% of money which high school students answering that they would go to at least 4 year university spent for private tutoring.

Conceptually, the view that considers expenses for private tutoring as the cost for going to university is based on game theory approach on the issue. According to Ji-ha Kim and Il-woo Paik[37], Korean parents strategically decide whether they consume private education service or not, with the aim of sending their children to one of prestigious universities. The interdependent and strategic independent factors, such as the rate of students who are expected to take private tutoring and the amount of willingness to pay for it, greatly influenced the demand for private education. In addition, based on estimated payoff matrix of private tutoring game, the author argues that the typical non-cooperative game, prisoners' dilemma game model, is suitable for explaining the parents' rational but wasteful consumption behavior. If private tutoring costs are exaggerated owing to the highly competitive circumstances for going to university, the inflated expenditures should be categorized as the cost of a university education because parents would not spend the money without the purpose.

Now, a significant issue is how to capture the private tutoring expenditures which are used for going to university. *The Survey of Private Education Expenditures*[38] conducted by KNSO is useful to deal with this matter because it provides information on the purpose of the

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[36] See table 3.

[37] Ji-ha Kim and Il-woo Paik, "Analysis of Demand for Private Tutoring on the Basis of Game Theory," *The Journal of economics and finance of education*, Vol.15, no.1 (2006), 210.

[38] *The Survey of Private Education Expenditures* is aimed at producing statistics about private education expenditure on a regular basis to establish policy reducing private education expenditure and fortifying public education. The survey items are suggested in appendix 1.

expenditures and covers from elementary school to high school.[39] In order to precisely calculate them, the amount spent on private tutoring should have been filled out according to their purposes. However, even the spenders cannot clearly categorize the whole cost by its objectives; thus, respondents are just asked to write the total amount of expenses and to pick up two purposes from five or six choices.[40] Therefore, this study assumes that if a respondent states the goal of the expenditure is to go on to university, the whole expense is used for the purpose, and vise versa. Fortunately, a problem caused by this assumption can be alleviated because the questions asking the amount of expenditure and its purpose are separated into those for 'private education of general subjects and essay writing' and those for 'private education of arts and physical activities, hobbies, and cultural education'.

Another problem is that in the questions which ask the objective of spending, choices such as 'Anxiety', 'Study in advance', and 'Makeup for classes' are ambiguous to determine whether they means 'going on to university' or not[41]. To be specific, according to the survey in 2008[42], only 17.9% percent of elementary students participated in 'private education of general subjects and essay writing' owing to 'Preparation for an entrance examination of higher grade school such as a college entrance examination (Preparation for a college entrance examination)'.[43] However, not all the remainder, 82.1% of elementary students, would invest the money in private education if they plan to have a job right after graduating high school. It is possible that just because the students are young and have a much long time to compete to go to university, their parents are likely to choose 'Anxiety' or 'Study in advance' rather than 'Preparation for a college entrance examination'.

[39] The raw data can be obtained in Micro Data Service System (http://mdss.kostat.go.kr).
[40] See appendix 2.
[41] See appendix 2.
[42] Korea National Statistical Office, *The Survey of Private Education Expenditures*, 2008, 105.
[43] See table 3.

From my perspective, given the high university entry rate over 70% and competitive consumption behavior for private tutoring, most students who study in advance, try to make up what they learned in classes, or worry that they may lag behind their peers, would ultimately aim to go on to university. However, since this issue is open to dispute, this study covers various possible cases. For instance, in the case of ‘private education of general subjects and essay writing’, the most conservative way is that only parents who select ‘Preparation for a college entrance examination’ are considered as those whose purpose is to let their children to go to university. Another extreme case is that all the parents who select one of the four controversial choices[44] are regarded as those who aim to go to university.

It’s relatively easier to judge about the expenditures for ‘private education of arts and physical activities, hobbies, and cultural education’ because there are just two cases. The first one is considering the parents who select either ‘Preparation for a college entrance examination' or 'Makeup for classes' as those who spend money in order to let their children to go to university. The second case is setting only ‘Preparation for a college entrance examination’ as a standard.

Table 3. Distribution of Characteristics by Reasons for Private Education of General Subjects and Writing (Multiple-choice)

	Preparation for a college entrance examination	Anxiety	Study in advance	Makeup for classes	Child care	Others
Elementary	17.9	36.5	68.1	50.9	3.3	6.3
Middle	34.6	32.8	56.6	57.9	-	2.1
High	73	22.9	38.8	47.9	-	1.3

Source: KNSO, The Survey of Private Education Expenditures, 2008, 105.

One thing which is not yet considered is the cost of repeaters in a college entrance examination. As aforementioned, since a bachelor´s degree from prestigious university is

[44] 'Preparation for a college entrance examination', 'Anxiety', 'Study in advance', and 'Makeup for classes'

considered as the prerequisite for success, a lot of students in South Korea retake the entrance examination. From 2000 to 2008, 25.7% of university entrants, on average, were repeaters.[45] The repeaters tend to pay more money for private tutoring because they no longer receive education from high school. Moreover, forgone earnings should been considered as well.

The cost can be estimated by using KEEP. In 2008, among 2,685 cohorts, 308 students retook a college entrance examination, and they spent about 5,710 thousand won a year on average. This expenditure can be identified as the cost for a university education because its purpose is clearly going to a university. The repeaters must not have spent it without the purpose. However, since not all the students repeat the examination, the cost should be adjusted by multiplying a probability that a university entrant has retaken the examination a year ago. The ratio of repeaters to university entrants can be used as an approximation of the probability.[46] After discounted in a year since the cost arises a year before entering a university, the adjusted value can be a part of the cost for university education at the age of 18. Forgone earnings should also be treated in the same way in order to be included as the cost for a university education.

[45] Jun-ki Ahn and Ho-Joong Bae, "Determinants of repeaters in college entrance examination and success factors of retaking the college entrance examination," *The Journal of Economics and Finance of Education*, Vol. 21, No. 2 (2012): 2.

[46] From 2000 to 2008, the average value is 25.7%

III-3. Estimation of internal rate of return to university education

In order to estimate the economic value of investment in education, this study uses the internal rate of return approach. The internal rate of return is the rate of interest that equates the discounted present value of expected benefits and the discounted present value of expected costs. The value of a university education can be evaluated by comparing its internal rate of return to those of other alternative investments. When it comes to investment in university education, the following computing formula can be used:

$$\sum_{t=n}^{0} \frac{C_t}{(1+r)^t} = \sum_{t=1}^{m} \frac{B_t}{(1+r)^t}$$

C_t: (additional) educational costs from university education per person in t year

B_t: (additional) educational benefits from university education per person in t year

n: years of education (from elementary school to university)

m: retirement age (65) - graduation age (22)

r: internal rate of return

The distinguishing feature of this study is that it covers more comprehensive lifetime costs of a university education, including a part of private tutoring cost before entering a university. The reason why it is the cost for a university education is explained in chapter III-2. Then, how can above model reflect this idea? It should be noted that IRR methodology covers a whole investment period when cash flows occur. Therefore, as long as the private tutoring expenditure is defined as the cost for the additional higher education, it must be included in the model although it does not arise while studying at university.

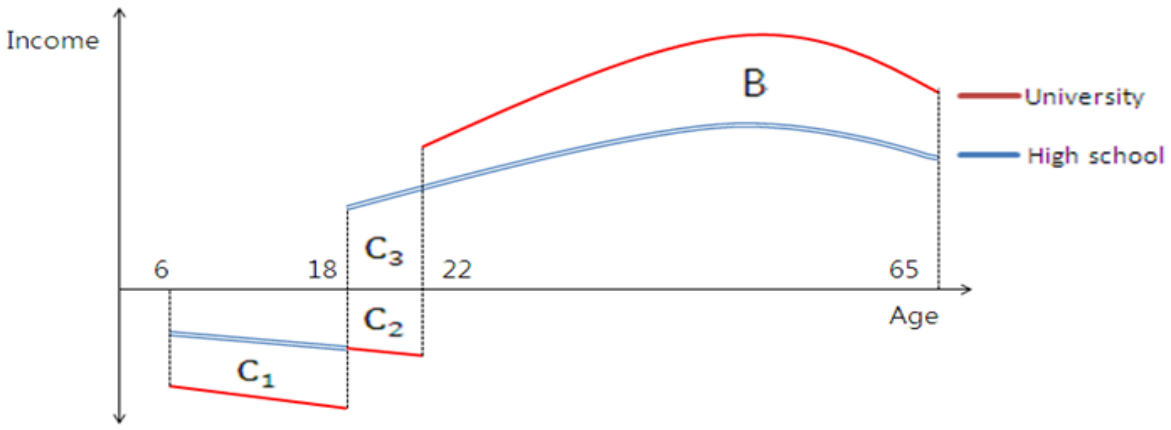

Figure2. The benefit and cost of university education

In this sense, *n*, years of education, is not just four years for which university students receive an education. It should be entire school years from an elementary school to a university, 12 years in South Korea. This view is expressed in the figure 2. The area of C_1 is the private tutoring cost for a college entrance examination. C_2 and C_3 indicate direct and indirect cost of university education respectively. Benefit of university education is the area of B, income differences between high school and university graduates.

In addition, at the age of 18, educational cost in the equation also includes theexpense of repeater in a college entrance examination. It consists of private tutoring cost and foregone earnings. They can be added after multiplied by a probability that a university entrant has retaken the examination a year ago and discounted in a year. This study assumes that students are enrolled in universities from age 18 to 21 year, and work by age 65 after graduation.

In chapter III-2, private tutoring cost during the school-age years is calculated in different ways because the choices in the survey question asking the purpose of spending are too ambiguous to determine whether they indicates ‘going on to university’ or not. The real internal rates of return are also suggested in that way as in the table 4. Not considering any expense for private tutoring for a college entrance examination, the real internal rate of return

to university education is 2.29% in male and 2.56% in female. In the most conservative case, when only parents who select ‘Preparation for a college entrance examination’ are considered as those whose purpose is to let their children to go to university, it’s 1.51% and 1.64%. The least value is 0.66 % and 0.67% when including all the controversial choices.[47]

Table 4. Internal Rate of Return to 4-year University Education

	Nothing is considered	Preparation for university	Preparation for university Study in advance	Preparation for university Anxiety Study in advance Makeup for classes
Male	2.29%	1.51%	0.95%	0.66%
Female	2.56%	1.64%	0.99%	0.67%

[47] 'Preparation for a college entrance examination', 'Anxiety', 'Study in advance', and 'Makeup for classes'.

IV. Implication

A study on social rate of return to education has significant implications because it helps to improve allocative efficiency of resources. By comparing the rate of return to a university education with those of other alternative investments, the government can prioritize limited public finance. Considering annualized real returns on 3-year government bonds (2.10%) and 10-year government bonds (2.76%) from 2001 to 2011, the investment on university education is less lucrative than alternative investments.[48]

This result can fill the gap between previous empirical studies sand government's active interventions for decreasing the high university entrance rate.[49] Although none of the studies question the economic value of university education, Korea government has promoted both public and private companies to hire high school graduates with a variety of incentives including government subsidy, assuming that current high university entry rate causes inefficiency from the social perspective. This study can be used as evidence for the policies

However, we should also consider the possibility that the result may come out of the research design itself-the way it defines benefits and costs-not suggesting the truly lower net benefit of college education. As aforementioned, the benefit of university education is narrowly defined. Thus, if other types of benefits are included, university education might be worthy to invest. Another source of underestimation problem may occur due to the assumption of the same retirement age between lower and higher education groups. It is probable that workers with higher education work longer than those with lower education, which guarantees higher income.

On the other hand, it may also be the case that benefit of university education is

[48] The Bank of Korea, *Economic Statistics System (http://ecos.bok.or.kr)*.

[49] Korea government are promoting both public and private companies to hire high school graduates with a variety of incentives including government subsidy, assuming that current high university entry rate causes inefficiency from the social perspective.

overestimated because the internal rate of return approach cannot control diverse factors which affect people's income level, such as inherent ability. Considering that students who perform well in school are more likely to go to university, the income difference between university graduates and high school graduates may result from not only the university education but also the gap in their abilities.

Although admitting the methodological limitations, it is still obvious that private tutoring costs for entering a university remarkably decrease the rate of return to university education. Given the empirical evidence that there is a only college admission effect of private tutoring, not human capital improvement effect[50], the government should take extensive measures to discourage exorbitant private tutoring for going to university.

Comparing the rate of return with those in the past or in other countries might also provide implications on the investment in education sector because it suggests a standard to evaluate the effectiveness of the investment: nevertheless, differences in the methodology, data, assumptions, and education system make it inappropriate.

[50] Taeil Kim, "The Effect of Private Tutoring during High School Years on the Academic Performance of College Years," *Korean Journal of Educational Research*, Vol. 43, No. 3 (2005): 29-56

Byung Cheoul Kim, "The Economic Effect of Private Tutoring" (Master diss., Seoul University, 2010).

V. Conclusion

The rapid increase in tertiary education entry rate in South Korea has aroused controversy on whether such a large amount of investment can be justifiable from the perspective of the economy as a whole. Even if there are some earlier studies on social rate of return to a university education, they do not consider cost for private tutoring for a college entrance examination.

According to Ji-ha Kim[51], parents decide whether they should consume private education service or not very strategically with the aim of spending their child into one of prestigious universities. The author argues that the typical non-cooperative game, prisoners' dilemma game model, is suitable for explaining the parents' rational but wasteful consumption behavior. If private tutoring costs are exaggerated owing to the highly competitive circumstances for going to university, the inflated expenditures should be categorized as the cost of a university education. A panel data from KEEP also supports this view. High school students answering that they would not go to university spent just 5~7% of money which high school students answering that they would go to at least 4 year university spent for private tutoring.

In this study, without taking into account private tutoring cost for a college entrance examination, a real internal rate of return to a university education is measured at 2.29% in male and 2.56% in female. The estimates including the costs vary from 0.66% to 1.64%. The result contradicts previous studies which argue that university education is still worth investing in and supports the government's effort to lower the high university entrance rate.

To conduct more precise study, we should consider all kinds of benefits such s non-monetary returns and external benefits as well as indirect costs including not only forgone earnings but also tax benefits given to universities, costs generated by not using educational

[51] Kim and Paik, "Analysis of Demand for Private Tutoring on the Basis of Game Theory," 210.

facilities for other economical purposes, and depreciation expense of the facilities. On top of that, we need longitudinal panel survey for over 40 years to accurately measure both benefits and costs of a university education.

Although there are several methodological limitations, it is still obvious that private tutoring expenditures remarkably decrease the rate of return to university education, and thus, the government should take extensive measures to discourage exorbitant private tutoring for going to university.

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APPENDIX

APPENDIX

1. Survey Items of 「The Survey of Private Education Expenditures, 2008」

Section	Question
◦Expenses for after-school program in school	- Child care program for elementary school - Program for the development of aptitude and specialty - Regular subject program - Others
◦EBS Textbook and Language Course	- EBS Textbook Expenses - Expenses for domestic foreign language courses (English camp or english village etc. in South Korea) - Expenses for foreign language course abroad
◦Private education expenditures for general subjects and essay writing	- Private education expenditure for general subjects and essay writing ·Korean, English, Maths, Social studies and Science, The second foreign language and Chinese characters, Essay writing - Reason for taking private education on general subjects - Time to spend for private education per week on average
◦Private education expenditures for Arts and Physical activities	- Private expenditure of arts and physical activities, hobbies and cultural education ·Music, physical activities, Arts, Hobbies·Cultural education - Reason for taking private education on arts and physical activities, hobbies and culture classes - Time to spend for private education per week on average
◦Private education expenditure for job seeking	- Private education expenditure for getting a job (Technical, Commercial, Agricultural and Computer Science high school, others) - Time to spend for private education per week on average
◦Student's demographics	- Student's demographics (school name, grade, class, sex) - Performance in class
◦Parents' demographics and household income	- Parent's demographics · Parent's age (in full), Educational attainment - Parent's economic activities - Average monthly household income

2. Questionnaire about the Purpose of Expenditures in 「The Survey of Private Education Expenditures, 2008」

A. (General subjects or essay writing): What are the main reasons for the private education on general subjects or essay writing that 'this child' takes? Please choose two answers.

1) Preparation for entrance examination of higher grade school such as a university entrance exam

2) Anxiety (I am afraid that my child falls behind; most other students take private education)

3) Study in advance (It is conducive to regular classes at school)

4) Makeup for class (My child has a trouble in keeping up with class at school; It is hard for my child to study for her/himself)

5) Child care (I have no one to take care of my child after school)

6) Friend-making

7) Other ( )

B. (Arts and physical activities, hobbies, and cultural education): What are the main reasons for the private education on arts and physical activities, hobbies, and cultural education that this child takes? Please choose two answers.

1) Preparation for entrance examination of higher grade school such as a university entrance exam

2) Makeup for class (Grade improvement)

3) Hobbies, cultural activities, and aptitude development, emotional stability, health

4) Child care (I have no one to take care of my child after school)

5) Friend-making

6) Other ( )