An Empirical Study on the Regional Gap of Korean High School Students' Academic Performances

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Abstract: This study empirically analyzed the variables that influence Korean high school students' academic performance. The teachers' union effect was found to be negative, which means that the improvement of teachers' status may not be connected to the heightening of the quality of public education. Also, a great academic performance gap was uncovered between students who reside in metropolitan cities and those who live in the countryside. Finally, the effect of the High-School Equalization Policy was found to be positive.

Keywords: Academic Performance, Private Tutoring Fee, Regional Gap

INTRODUCTION

This study consists of an empirical analysis conducted to ascertain whether a regional gap exists in terms of Korean high school students' academic performances. The researchers conducted a regression analysis using data from the Korean Education and Employment Panel Survey in which third year high school students' scores on the Korean Scholastic Aptitude Test served as the dependent variable, and the regional variable, school variable, household variable, and student variable were utilized as the explanatory variables.

The search for the existence of a regional gap in students' academic performance is a significant undertaking, in that such a gap between high school students' academic performances is in all likelihood related to the income gap that emerges between them once they become adults. Therefore, an academic performance gap between students can be regarded as an obstacle in the pursuit of balanced regional development. In addition, the presence of educational conditions in local provinces or in the countryside that are inferior to those found in metropolitan cities may be one of the main causes for the concentration of the population in such cities.

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Existing empirical studies on the factors that play a decisive role in academic performance can be separated into two categories. The first group of studies focuses on the functions of tutoring fees at the individual household level. These studies consider tutoring fees to be the dependent variable, while regarding household income and parents and students' characteristics as the explanatory variables.[1] Meanwhile, the other group of studies is based on the use of students' academic performance as the dependent variable, and tutoring fees and economic ability as the explanatory variables.[2] Both categories of studies have focused on variables that demonstrate the characteristics of the students and parents to explain the academic performance gap between students. However, they have failed to explicitly test for the existence of a regional academic performance gap.

This study contrasts from existing studies in two aspects. First, whereas existing studies used data from surveys conducted by researchers, this study utilized more objective data taken from a survey conducted by the Korea Research Institute for Vocational Education & Training. Students, parents, teachers, and school administrators participated in this survey. The securing of various kinds of variables with which to demonstrate the characteristics of schools and teachers created the opportunity to establish a more precise model. For example, existing studies have tended to disregard variables such as the rate of participation in the teachers' union and the number of teachers in each age group.

Second, in order to thoroughly analyze the regional academic performance gap, the model developed in this study included variables that demonstrate the city effect of Seoul and six metropolitan cities and variables that exhibit the effects of the High-School Equalization Policy. In general, a city effect naturally emerges as an element of the academic performance gap. However, in Korea, the effects of the High-School Equalization Policy are intertwined with this city effect. By successfully separating these intertwined effects, this study was able to estimate the pure city effect.

Two theoretical problems can be identified with regards to the empirical analyses designed to identify the decisive factors in terms of Korean high school students' academic performance: First, the impact of individual schools on students' academic performance cannot be estimated when utilizing a model that makes use of data by school district. The potential problems that can emerge when using data by school district without making use of any micro data pertaining to individual students have already been pointed out in studies by Gintler et al. (2000) and Summers et al. (1977). The use of micro data in this study ensures that such problems will not emerge.

1. See Lee (2004), Yoo et al. (1999), Park (1998), Kim et al. (1996).
2. See Kim (2003), Lee (2002), Han et al. (2001).

Second, some scholars have pointed out that it is desirable to estimate decisive factors in students' academic performances using a hierarchical linear model in cases where organizational characteristics such as regional and school variables and individual characteristics such as the student variable are considered simultaneously. Such an approach, they claim, is warranted by the fact that students who belong to the same organization can be exposed to the influence of the same organizational characteristics.[3] However, rather than using a hierarchical linear model, this study selected a method that involved the inclusion of dummy variables that reveal regional characteristics.

As pointed out by Kim (1999), the explanatory variables of the equation estimated during the first stage must be individually defined and estimated during the second stage when a hierarchical linear model is employed. Therefore, the actual establishment of the model becomes more complex when numerous explanatory variables are included. One of the main objectives of this study is to measure the academic performance gap at the regional level. For example, the most convenient way to measure the academic performance gap in Seoul and Busan is to include and estimate two regional dummy variables in the model, and then compare the size of their coefficients.

This study unfolds as follows: Chapter 2 explains the model used to analyze the regional gap between Korean high school students' academic performances. The data used to carry out the actual estimation are explained in chapter 3. The outcomes of the model estimation are discussed in chapter 4. Chapter 5 presents the conclusion and policy implications.

MODEL

In order to verify the regional academic performance gap, this study estimated a model for Korean students' academic performance and analyzed the sign and size of the coefficients of the various regional variables. A regression analysis that made use of students' total Korean, English, and Mathematics scores on the Korean Scholastic Aptitude Test as the dependent variable was utilized.[4] This model also features four groups of explanatory variables. This model can be regarded as the production function approach, which exhibits students' academic performances as an output and the various explanatory variables as inputs. The production function, as used in its classi-

3. For more details, refer to Kim (1999).

4. There are two kinds of scores on the Korean Scholastic Aptitude Test: the standard scores and percentile ranks. As this paper uses percentile ranks as the dependent variable, the dependent variable ranges between 0 and 300. We can regard it as a continuous variable.

cal context, relates the maximum attainable level of output for a given level of inputs.

Casual observation combined with educational literature suggests that students' academic performance is a function of a student's individual characteristics, household characteristics, school quality, and regional variables. This relationship can be expressed as[5]

$$y_i = R_i\alpha + S_i\gamma + H_i\beta + I_i\delta + \varepsilon_i$$

y_i: Students' academic performance
R_i: Vector consisting of regional variables
S_i: Vector consisting of school variables
H_i: Vector consisting of household characteristics
I_i: Vector consisting of students' characteristics

Researchers have been struggling to identify which package of school inputs is appropriate for each type of student in order to equip him or her for educational growth. From a wider perspective, the academic attainments of youths are viewed in the pertinent literature as the outcome of a production process in which both parental choices (or family circumstances) and neighborhood and school circumstances influence youth outcomes (Havenman et al. 1994; Ginther et al. 2000).

Although past research has shown personality as a valid predictor of academic performance (Wolfe et al. 1995; Tross et al. 2000; Lounsbury et al. 2003), the study of the influence of neighborhood factors (including teacher quality, nonteacher school quality, and parental characteristics) on students' academic performance remains relatively rare. This study utilizes household-level data and four groups of input variables that are hypothesized to affect student's academic performance in the empirical model specification spelled out below.

Regional variables are the most important of the four groups of explanatory variables utilized in this study. Although residence in Seoul and the six metropolitan cities is usually perceived as having a more positive effect on students' academic performances than residing in small cities and counties, residing in towns (eup) and villages (myeon) is actually expected to have a negative effect on students' academic performance. Moreover, the High-School Equalization Policy, which allocates students to particular schools in a random manner, can also have an effect on students' academic performance because it has only been applied in specific areas.[6]

5. The model used in this paper is based on the model developed by Summers et al. (1977).
6. The High-School Equalization Policy was first implemented in Seoul and Busan in 1974

Table 1. The Current State of the High-School Equalization Policy in 15 Cities and Provinces

	Equalized	Non-equalized
Seoul	Overall areas	–
Six metropolitan areas	Overall areas	–
Gyeonggido	Suwon, Seongnam, Anyang, Bucheon, Goyang, Gwacheon, Uiwang, Gunpo	The remaining areas
Chungcheongbukdo	Cheongju	The remaining areas
Jeollabukdo	Jeonju, Gunsan, Iksan	The remaining areas
Gyeongsangnamdo	Jinju, Masan, Changwon	The remaining areas
Gangwondo	–	Overall areas
Chungcheongnamdo	–	Overall areas
Gyeongsangbukdo	–	Overall areas
Jeollanamdo	–	Overall areas

Source: Ministry of Education and Human Resources Development.

Table 1 shows how the High-School Equalization Policy has been implemented in 15 provinces and cities (excluding Jejudo) across Korea. As we can see in this table, this policy has been applied in Seoul and the six metropolitan cities. However, while Gyeonggido, Chungcheongbukdo, Jeollabukdo, and Gyeongsangnamdo feature a mix of equalized and nonequalized areas, the High-School Equalization Policy has not been implemented in Gangwondo, Chungcheongnamdo, Gyeongsangbukdo, and Jeollanamdo. Here, it is important to point out that even where the High-School Equalization Policy has been partially implemented at the city and provincial levels, it has not been applied at the eup and myeon levels. Therefore, the proper definition of the regional variables represents an essential element when it comes to the separation of the city effect and the High-School Equalization Policy effect.

The dummy variables SEOUL, BUSAN, DAEGU, INCHEON, GWANGJU, DAEJEON, and ULSAN were used to represent the city effect. These dummy variables indicate how residence in metropolitan cities influences students' academic performance. Similarly, the CITY variable shows the degree to which, when compared to

and has now been in place for 30 years. The main policy objectives have been to achieve balanced educational development at the regional level, limit the concentration of students in metropolitan cities, and ease the gap between high schools (Kim et al., 2004). Opponents of this policy have argued that it has resulted in a lowering of high school students' academic performance. Although a peer-group effect leading to a greater gap between the two groups of students might emerge when students are divided into those who do well in school and those who do not do so well, there is no way to confirm that the gap between the average academic level of the two groups will expand.

Table 2. List of Variables

	Definition
SEOUL	Dummy variable; Seoul = 1
BUSAN	Dummy variable; Busan = 1
DAEGU	Dummy variable; Daegu = 1
INCHEON	Dummy variable; Incheon = 1
GWANGJU	Dummy variable; Gwangju = 1
DAEJEON	Dummy variable; Daejeon = 1
ULSAN	Dummy variable; Ulsan = 1
CITY	Dummy variable; the administrative district is Si or Goon = 1
NON_EQUALIZED	Dummy variable; region in which equalization policy is not applied = 1
COLLEGE_RATE	Enrollment rate in 4-year universities located in Seoul (unit: percent)
HISTORY_10	Dummy variable; schools with a history of less than 10 years = 1
HISTORY_30	Dummy variable; schools with a history of more than 30 years = 1
UNION	Rate of participation in teachers' union (unit: percent)
TEMPORARY	Proportion of temporary teachers (unit: percent)
AGE_50	Proportion of teachers in their 50s or 60s (unit: percent)
COLLEGE	Dummy variable; mothers who graduated from high school or college = 1
GRADUATE	Dummy variable; mothers who graduated from a 4-year university or graduate school = 1
HOMEOWNER	Dummy variable; homeowner = 1
CAROWNER	Dummy variable; households possessing two or more cars = 1
TUTOR_FEE	Monthly tutoring fees (unit: ten thousand won)
MALE	Dummy variable; male student = 1

residence in the countryside, residence in small cities positively influences students' academic performance.

The NON_EQUALIZED variable is used to show the effect of areas in which the equalization policy is not applied. As this indicates that the average academic performance of the students from the areas in which the equalization policy is not applied is lower than that of the students from areas in which it is in place, the High-School Equalization Policy can be interpreted as having contributed to heightening students' average academic performance when the sign of the coefficient of this variable is negative.

School characteristics can also influence students' academic performance. This study includes the enrollment rate in 4-year universities located in Seoul (COLLEGE_RATE) and the variables showing school history (HISTORY_10, HISTORY_30). In addition, the rate of participation in teachers' unions (UNION), teachers' age structure (AGE_50), and the proportion of temporary teachers (TEMPORARY) are used to show the

characteristics of the teachers. In this regard, it is difficult to predict whether a high rate of participation in a teachers' union will positively or negatively influence students' academic performance.

The variables showing the characteristics of the household to which individual students belong—monthly private tutoring fee (TUTOR_FEE); the two variables used to show the economic capabilities of the household indirectly (HOMEOWNER, CAROWNER)[7]; and the variable showing mothers' academic background (COLLEGE, GRADUATE)-are included in the model. The assumption is that student's levels of academic achievements will rise in conjunction with the amount of tutoring fees paid and the mothers' academic levels.[8] Lastly, a perception has emerged that female students' grades are higher than those of male students. If such a claim is in fact true, then the sign of the coefficient of the MALE variable would be negative.

DATA AND DESCRIPTIVE STATISTICS

This study used data from the first edition of the Korean Education and Employment Panel Survey compiled by the Korea Research Institute for Vocational Education & Training. As we can see from the name of this particular compilation, the data collected herein is in panel data form. As 2004 was the first year in which this survey was conducted, this data should be considered to have the characteristics of cross-section data until the results of the second year of the survey are included.

Six thousand students (2,000 students each from middle schools, regular high schools, and vocational high schools, in the third year of study in their respective schools) took part in the survey. However, the present study only utilized data from those students who were in their 3rd year in regular high schools, because it was deemed desirable to select students whose academic achievements could easily and clearly be measured. Furthermore, this study only utilized data for students who participated in the English, Mathematics, and Korean sections of the Korean Scholastic Aptitude Test; meanwhile, the students who have omitted variables were excluded from the sample. As a result, the final sample size used in this study was 1,486.

7. As the majority of households in Korea own one car, we regard those households with two or more cars as households that possess more wealth.
8. In order to verify whether parents' academic background is transferred to their children, this study considered mothers' academic background as the explanatory variable. As a multicollinearity problem might emerge when both parents' academic backgrounds are simultaneously considered, we included only mothers' academic levels in the model. In general, mothers' academic levels are perceived as being easier to transfer to children.

Table 3. Descriptive Statistics for Explanatory Variables

	Distribution		Distribution
SEOUL	24%	MALE	56%
BUSAN	7%	HOMEOWNER	72%
DAEGU	5%	CAROWNER	10%
INCHEON	5%	COLLEGE	61%
GWANGJU	3%	GRADUATE	17%
DAEJEON	2%	HISTORY_10	10%
ULSAN	2%	HISTORY_30	49%
CITY	35%	NON_EQUALIZED	17%

	Mean	Standard Error	Maximum
TUTOR_FEE	302,000 won	343,000 won	4,000,000 won
COLLEGE_RATE	7%	5%	26%
UNION	61%	24%	100%
TEMPORARY	8%	8%	35%
AGE_50	17%	10%	51%

Table 3 displays the descriptive statistics of the variables used as the explanatory variables in the regression analysis. First, the regional distribution of households included in the sample was similar to that of the overall Korean population, thus proving that there was no bias in the sample. More than 70% of the households included in the survey were homeowners. However, only 10% of the households owned two cars or more. In terms of mothers' academic levels, while in excess of 60% of mothers graduated from high school or a 2-year college, only 17% graduated from university or graduate school, indicating that the proportion of women with university degrees or higher still remains low.

With regard to the school-related variables, one out of every two schools was founded at least 30 years ago, and only 10% of the schools were founded less than 10 years ago. Seventeen percent of the schools included in the survey were located in nonequalized areas. Moreover, whereas the rate of participation in teachers' unions was 61%, 8% of teachers were found to be temporary teachers and 17% to be in their 50s. Contrary to commonly held fears, the proportion of nonregular and aging teachers remains rather low. The average monthly tutoring fees paid out by households was found to be approximately 300,000 won; however the standard error was 340,000 won. This result indirectly shows the polarization problem that may exist in terms of tutoring fees.

Lastly, Table 4 shows average academic performance by region. The average scores on the Korean Scholastic Aptitude Test of students from Seoul and the six metropolitan cities were found to be significantly high. In the cases of Busan, Daegu, and

Table 4. Test for Academic Performance Gap by Region

	Mean	t-value	P-value
SEOUL = 1	147.28	-0.35	0.72
SEOUL = 0	145.87		
BUSAN = 1	176.57	-4.75	0.00
BUSAN = 0	143.82		
DAEGU = 1	157.97	-1.50	0.14
DAEGU = 0	145.65		
INCHEON = 1	155.06	-1.24	0.22
INCHEON = 0	145.72		
GWANGJU = 1	179.19	-3.59	0.00
GWANGJU = 0	145.28		
ULSAN = 1	157.69	-0.93	0.36
ULSAN = 0	145.99		
DAEJEON = 1	148.46	-0.26	0.79
DAEJEON = 0	146.14		
NON_EQUALIZED = 0	157.19	9.05	0.00
NON_EQUALIZED = 1	124.40		

Gwangju, a statistically significant gap was also uncovered. In addition, the scores of students from nonequalized areas were revealed to be lower than those of students from equalized areas.

ESTIMATION RESULTS

The STATA program was employed in this study to estimate the model. Table 5 shows the estimation results of the equation of students' total scores for Korean, English, and Mathematics, which were used as the variable for academic achievement. As the characteristics of a regression analysis make it so that the coefficient of the explanatory variable indicates the degree to which the dependent variable is changed when the explanatory variable is increased by 1 unit, this study focused on exhibiting the degree to which students' scores increased whenever the explanatory variable was increased by 1 unit.

Private tutoring fees was the variable expected to directly influence students' academic achievement. In this regard, the estimation results indicate that the scores increased in conjunction with monthly private tutoring fees. Nevertheless, as the coefficient of the TUTOR_FEE variable was found to be 0.1, thus indicating that a stu-

Table 5. Equation for the Determinants of Korean Students' Academic Performance

	Estimate	Standard error	t-value	P-value
SEOUL	10.73	8.79	1.22	0.22
BUSAN	44.60	9.53	4.68	0.00
DAEGU	38.17	11.13	3.43	0.00
INCHEON	20.90	11.02	1.90	0.06
GWANGJU	49.42	12.70	3.89	0.00
DAEJEON	44.68	12.90	3.46	0.00
ULSAN	43.94	14.22	3.09	0.00
CITY	23.00	6.40	3.60	0.00
NON_EQUALIZED	-14.57	6.17	-2.36	0.02
HOMEOWNER	8.68	3.89	2.23	0.03
CAROWNER	21.77	5.84	3.73	0.00
TUTOR_FEE	0.10	0.05	1.91	0.06
COLLEGE	10.32	4.17	2.48	0.01
GRADUATE	25.09	6.01	4.17	0.00
MALE	-8.32	3.53	-2.35	0.02
HISTORY_10	-22.69	6.62	-3.43	0.00
HISTORY_30	7.14	4.22	1.69	0.09
COLLEGE_RATE	1.83	0.44	4.18	0.00
UNION	-0.26	0.08	-3.22	0.00
TEMPORARY	-0.72	0.23	-3.07	0.00
AGE_50	-0.66	0.21	-3.11	0.00
Sample size	1,486			
Adjusted R^2	0.17			

dent's score increased by 10 points when the private tutoring fees were increased by 1 million won, the effects of tutoring fees on students' academic achievement can be regarded as being rather insignificant. Meanwhile, mothers' academic levels were also found to have an influence on students' academic achievement. Students whose mothers graduated from high school or college on average scored 10 points higher than students whose mothers only graduated from middle school. In the meantime, students whose mothers graduated from a 4-year university or higher scored 15 points higher on average than those students whose mothers graduated from high school or college.[9]

Thus, the tutoring fee and mothers' academic levels, which represent the characteristics of households, were found to have positive influences on students' academic achievement. In this regard, mothers' academic levels were found to have a bigger

9. The number 15 was arrived at by subtracting the coefficient of the COLLEGE variable, 10, from the coefficient of the GRADUATE variable, 25.

influence on students' academic achievement. Thus, whereas tutoring fees were relatively less significant in reflecting students' academic achievement, parents' academic levels were more directly transferred to students.

As expected, the signs of the coefficients of the variables demonstrating the economic capabilities of households were also revealed to be positive. For example, the scores of students from households that possess a house (HOMEOWNER) or two or more cars (CAROWNER) were estimated to be 9 and 22 points higher, respectively, than those of students from households that do not possess these assets.

The characteristics of the schools that the students attended, as the variable used to demonstrate the quality of the public school provided to the relevant students, have a great influence on students' academic achievement. The model developed in this study included three variables demonstrating the characteristics of public schools. The average score of students who attended schools with a history of less than 10 years (HISTORY_10) was approximately 23 points lower than average, while the average score of students who attended schools with a history of more than 30 years (HISTORY_30) was found to be about 7 points higher than the average. In addition, the enrollment rate in 4-year universities of former students from each school also had a positive influence on students' scores. When a school's enrollment rate in 4-year universities increased by 10%, the average score of the students who attended the relevant school increased by 18 points.

Even more interesting is that the variables related to the teachers at the schools were also found to have an influence on students' academic performance. Students' scores on the Korean Scholastic Aptitude Test decreased by 2.6 points when the participation rate in a teachers' union increased by 10%. This amount cannot be considered insignificant. As seen above, average participation rate in teachers' unions was 61%. It is significant that in Korea a negative teachers' union effect exists, at least in terms of academic achievement.[10]

In addition, when the proportion of temporary teachers was increased by 10%, students' scores decreased by an average of 7.2 points. When the proportion of teachers in their 50s was increased by 10%, the students' scores decreased by 6.6 points. When we define temporary teachers as teachers with limited experience and those in their 50s as teachers who are aging, then the decrease in students' academic performance as the proportion of less experienced teachers and aging teachers increases can be considered a natural phenomenon.

The main objective of this study was to empirically analyze the regional gap.

10. In the case of schools in which the participation rate in a teachers' union was 61%, the union effect was estimated at about 16 points (61 * 0.26).

Therefore, the main interest of this study is how residence in metropolitan cities or cities and in nonequalized areas influences students' academic performance.

First, the coefficients of the regional dummy variables for Seoul and metropolitan cities were estimated to fall anywhere between 11 and 49, thus indicating that residence in metropolitan cities has a positive influence on students' academic performance. While the size of this positive effect obviously varies from region to region, the city effect was interestingly enough found to be highest in Gwangju and smallest in Incheon. This outcome can be understood to stem from the fact that Incheon's close proximity to Seoul resulted in its recording the smallest city effect. Similarly, in the case of the Yeongnam area, the geographic rivalry pitting Daegu against Busan can be understood as the main reason why the city effect in these cities was lower than in the case of Gwangju.

Like residence in metropolitan cities, residence in small cities (si) and counties (goon) was also found to have a positive influence on students' academic performance. The coefficient of the CITY variable was estimated at 23. The scores of students from small cities and counties were estimated to be on average 23 points higher than that of those from the countryside.

In this study, the scores of students from high schools located in Seoul were estimated to be on average 11 points higher that those of students from non-Seoul areas. This result can be considered statistically insignificant, because no pure Seoul effect was found once factors such as the characteristics of students, households, and teachers' influence on students' scores were removed. When we compare the average scores of students attending regular high schools (excluding students from Specialized-Educational High Schools, of which there are a large number in Seoul), the Seoul scores cannot be much higher than those of other regions. As these Specialized-Educational High Schools have played a role similar to that of elite schools in nonequalized areas, regular Seoul high school students' academic performance is deemed to not be higher than that of students from other regions.

Finally, the most interesting variable in this paper was the NON-EQUALIZED variable. This variable shows whether the High-School Equalization Policy has played a positive or negative role in terms of students' average academic performance. Our estimation revealed that the coefficient of the NON-EQUALIZED variable was -14.3. That is, the scores of students who attended high schools in nonequalized areas were on average 14 points lower than those of students from equalized areas.

As these nonequalized areas are composed of a few elite schools and a majority of regular high schools, the elite students in these areas tend to be concentrated in the relatively small number of elite schools. Meanwhile, as the students are randomly allocated in equalized areas, no significant academic performance gap exists between

schools.[11] Therefore, the fact that the scores of students who attend nonequalized local high schools is lower than those of students attending schools in equalized areas implies that the education of students in accordance with their academic abilities may in fact worsen academic polarization. In other words, the negative impact that such a separation would have on those students who perform poorly academically might be larger than the positive effect that students who perform well academically would gain from being grouped together. Of course, arguments may emerge as to whether the objectives of secondary education are to educate elite manpower or to increase average academic performance. However, we can conclude that the High-School Equalization Policy has had an effect in terms of heightening students' average academic performance.

CONCLUDING REMARKS

This study empirically analyzed the variables that influence Korean high school students' academic performance. In this regard, while the variables commonly found in existing studies were found to influence the academic performance, new findings were also uncovered.

First, while the effect of tutoring fees was not very significant, parents' academic levels and the quality of public education were revealed to have a great influence on students' academic performance. For example, schools with long traditions and a high university enrollment rate were found to have a more positive influence on students' academic achievement. These results carry two implications: One is that, contrary to general expectations, it is difficult to mitigate the academic performance gap caused by the qualitative gap in public schools through tutoring. The other is that the phenomenon in which parents' academic background is transferred to their children, or so-called hereditary education, may emerge as a social problem. Thus, policies designed to improve the quality of public schools would be the best means of easing the academic performance gap.

Second, in the Korean case, the teachers' union effect was found to be negative, which means that the improvement of teachers' status through the establishment of teachers' unions may not be connected to the heightening of the quality of public education. In addition, the fact that students' academic performance decreased when the

11. Some have argued that a significant academic performance gap exists between the students from the Gangnam and Gangbuk areas of Seoul. However, such claims cannot be made in the case of equalized non-Seoul areas.

proportion of teachers in their 50s increased carried with it interesting policy implications; namely, that in order to heighten the quality of public school, it is necessary to secure teachers in their 30s and 40s.

Third, a great academic performance gap was uncovered between students who reside in metropolitan cities and those who live in the countryside. Given the fact that this gap in the long run becomes linked to the income gap, we may conclude that the regional income gap can only be decreased by addressing the issue of the regional academic performance gap. This is precisely the reason why investment in public education should be considered a priority when it comes to the achievement of balanced regional development.

Fourth, the effect of High-School Equalization Policy was found to be positive. Thus, the claims that the present equalization policy should be maintained (because the separate education of students according to their academic achievement levels would worsen academic polarization) can be regarded as having some validity.

The limitations of this study can be summarized as follows. While the majority of relevant studies in the field of economics have addressed the decisive factors in terms of households' educational expenses, the main focal point in the fields of pedagogy and sociology has been students' academic achievement. Viewed from this standpoint, this study can be regarded as falling in the latter category. However, in order to conduct better studies, the interaction between students' academic achievement and educational expenses should be thoroughly addressed. Rather than assuming that students' academic achievement influences educational expenses, or conversely that educational expenses influence students' academic achievement, future studies should be conducted under the assumption that these two variables influence one another.

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