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School Choice and Educational Inequality in South Korea

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Abstract

This study examined the choice debate in South Korea, which centers on the residentially based school assignment policy called the High School Equalization Policy (HSEP). Using a nationally representative sample of South Korean 11th graders, the study further explored the role of the HSEP in educational equality by investigating how HSEP implementation was related to the separation of low and high socioeconomic status (SES) students between schools and how the socioeconomic composition of a school was related to student achievement. Results showed that the odds that low SES students were separated into low SES schools was smaller in the regions of HSEP implementation, where students were randomly assigned to a school based on place of residence, than in the regions of non-HSEP implementation, where students were allowed to choose a school. Results also showed that student achievement significantly depended on the socioeconomic composition of a school students attended in the regions of non-HSEP implementation, whereas this was not the case in the regions of HSEP implementation. We discussed the implications of these findings for the potential impact of school choice policies on educational inequality.

Over the past few decades, school choice has been increasingly adopted as part of educational reform programs¹ across the world in an effort to create a more responsive school system and improve student achievement (Chakrabarti & Peterson, 2009; Forsey, Davies, & Walford, 2008; Lubienski, 2009). However, much research on school choice still focuses on Western countries, most notably the United States. Although choice issues in non-Western countries have been increasingly investigated in recent years (Constant et al., 2010; Tooley, Bao, Dixon, & Merrifield, 2011), much remains to be investigated about educational contexts in which choice debates take place, types of choice reform emerging, and the impact that choice reform has on educational achievement and equality in non-

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¹In the United States, for example, school choice policies include: (a) charter schools that are publicly funded but operate independently under charters granted by public agencies; (b) inter-district choice, in which open enrollment options are offered within the existing public school system but outside the student's district of residence; (c) intra-district transfers in which students may attend any school operated within a particular district; (d) magnet and alternative schools in which specialized courses are offered by public school districts; and (e) school vouchers or tuition tax credits that may be redeemed by parents at private, as well as public, schools (Arson, Plank, & Sykes, 1999).

Western countries. Thus, an important way of extending the school choice literature is to examine choice policies and their impact in non-Western countries.

In this article, we examine the choice debate in South Korea (hereafter Korea). As will be described in more detail later, Korea's choice debate largely centers around the High School Equalization Policy (HSEP), which assigns academic high school-bound students to schools within their residential area on the basis of a random computerized lottery. Like choice debates (see Goldhaber 1999; Gorard, Fitz, & Taylor, 2001; Lubienski 2003 for reviews), two key issues have emerged: (a) whether this random school assignment policy decreases student achievement and (b) whether it discourages educational equality. Critics of the HSEP argue that this policy should have a negative impact on student achievement because it results in a heterogeneous classroom setting, where high and low achievers are mixed, and makes it difficult for teachers to manage instructional activities. Critics also claim that HSEP implementation would increase inequality between the haves and the have-nots in a sense that it tends to trap lower socioeconomic status (SES) parents and students into their neighborhood schools, which are usually of low quality.² On the contrary, advocates of the HSEP contend that it can help improve student achievement especially for low SES students because these students who would otherwise be left behind can benefit from attending a more socioeconomically integrated school. As such, the arguments of proponents and opponents of the HSEP provide an interesting parallel to those of the choice advocates and critics in other countries, and we hope to bring this choice debate in Korea to the attention of a wider audience worldwide.

Moreover, and perhaps most importantly, whereas prior research on the HSEP has exclusively focused on testing the direct effect of HSEP implementation on school achievement, this study empirically investigates the role of the HSEP in promoting educational equality, using nationally representative data. Like choice debates (see Gorard et al., 2001 for a review), a key assumption underlying the HSEP debate on educational equality is that the HSEP will increase or decrease the separation of low and high SES students between schools. Yet little is known about how HSEP implementation is related to the separation of low and high SES students between schools. In fact, regardless of whether HSEP implementation increases or decreases the separation of low and high SES students between schools, the HSEP itself may not necessarily affect educational equality unless the socioeconomic composition of a school affects educational outcomes. However, if HSEP implementation changes the socioeconomic composition of a school by concentrating low or high SES students into a particular school and school's socioeconomic composition in turn influences student learning processes and outcomes, it will then affect educational equality especially for low SES students because of the possibility of 'double disadvantage' for these students (i.e., low SES students are disadvantaged because of their circumstances at home and at school) (Park & Kyei, 2010). Therefore, two questions guided our investigation of the role of the HSEP in affecting educational equality: (a) does the HSEP relate to the separation

²Under the HSEP, access to a particular school is directly linked to where a student lives. Unless parents can afford to buy or rent a house in a certain catchment area in which popular schools are located, their children cannot attend these schools. Because wealthier families can purchase more expensive housing in these areas, they are more likely to live around the best schools. For this reason, the critics argue that HSEP implementation would increase residential segregation by increasing the price of houses in a catchment area where it is believed the best schools are largely located.

of low and high SES students between schools? And (b) does school's socioeconomic composition relate to student achievement? By simultaneously testing these two questions, rather than by simply examining the choice debate in Korea, our study contributes to the current HSEP and choice debate on educational equality.

BACKGROUND AND PRIOR RESEARCH

The Educational Setting in Korea

The Korean K-12 education system represents a 6-3-3 pattern: the primary (grades 1-6), lower secondary (grades 7-9), and upper secondary (grades 10-12). Generally speaking, tracking takes place at the upper secondary level along with the two types of high schools: (a) academic and (b) vocational or technical schools. Academic high schools are college preparatory schools in which the majority of Korean adolescents (approximately 72% of all high school students in 2010) are enrolled. Beginning in 11th grade, academic high schools offer two different curriculum tracks: liberal arts (humanities and social sciences) and natural sciences, where the latter track more emphasizes on math and science than the former. Vocational or technical high schools are designed for students (approximately 27% of all high school students in 2010) who want to develop vocational skills and enter the labor market immediately after graduation but an increasing number of graduates from this type of school have been enrolling in postsecondary institutions (Ministry of Education, Science, and Technology [MEST], 2010).

Students are generally assigned to a neighborhood school in primary and lower secondary education. In upper secondary education, however, vocational high school-bound students are allowed to choose a school. For the academic high school-bound students, school assignments are complicated by HSEP implementation. Although varying from region to region (Y. Kang, Yoon, Lee, & Kim, 2005), general assignment procedures under the HSEP are as follows: (a) academic high school-bound students are screened on the basis of their middle school records (e.g., school performance), (b) screened students are allowed to apply to a limited number (two or three) of academic high schools within their school district, and (c) they are assigned to one of those schools by a computerized lottery system.

It is important to note that the HSEP applies to both private³ and public schools, which results in little variation in the socioeconomic background and academic ability of incoming students between these two types of schools. It is also important to note that whereas all schools in metropolitan areas are affected by the HSEP, only a few schools in rural areas are affected by this random assignment policy. As of 2009, approximately 25 major cities implemented the HSEP, accounting for approximately third-quarters of the academic high school student population in Korea (MEST, 2010). In a region not adopting the HSEP, students are allowed to apply to a particular high school that they wish to enter. These contrasting features of academic high school assignments by HSEP implementation make Korea an ideal setting for the study investigating one of the key choice debates: whether expanded choice will increase or decrease the separation of low and high SES students

³Korean private schools are to a large extent subsidized and controlled by the government.

between schools in comparison to the random school assignments based on place of residence.

A Brief History of the High School Equalization Policy

The HSEP was proposed by the Ministry of Education (MOE) in 1973 in response to the social and educational problems resulting from excessive competition to enter elite high schools in the late 1960s and early 1970s (MOE, 1998). In those days, upper secondary education in Korea was based on a free competition system where students were allowed to choose their schools (MOE, 1998). Under these circumstances, a few elite high schools, most of which were public and located in large cities such as *Seoul* (the capital and largest city) and *Busan* (the second largest city), emerged and selected only those students in the upper tier, leading to serious inequalities between the elite high schools and the remaining schools in terms of student academic ability, socioeconomic backgrounds, and the quality of teachers (Chung, 1998; MOE, 1998; Park, 1988).

The HSEP was first implemented in 1974 in *Seoul* and *Busan*, where these educational problems had been seen the most. Although not entirely agreed, the policy is considered to have had significant impacts: (a) the disparity between high schools was reduced, (b) the middle school curriculum was normalized, and (c) students' heavy workloads as well as parents' financial burden of paying for private tutoring to enter elite high schools were alleviated (Chung, 1998; Park, 1988). At the same time, however, several other problems emerged, including (a) restricting students' and parents' right to choose schools and (b) making it difficult for teachers to teach students because of extreme individual differences in academic ability (Chung, 1998; Park, 1988). As noted earlier, these issues generated considerable debates on the expansion of the HSEP particularly concerning two key issues: (a) whether the HSEP decreases student achievement and (b) whether it discourages educational equality.

Despite the controversies over these two issues, the HSEP was expanded to other metropolitan cities such as *Daegu*, *Incheon*, and *Gwangju* in the following year (1975). In the late 1970s and early 1980s, it was further expanded to several other large cities including *Chuncheon* (1979), *Cheonan* (1980), and *Changwon* (1981). However, at the turn of the 1990s when educational excellence emerged as a key issue regarding national competitiveness in the global market, the critics began to argue that the HSEP would harm Korea's competitiveness because of its negative impact on the accumulation of human capital, and they gained more ideological and political support than ever before. Furthermore, as the neoliberal alternatives began to dominate the process of policy making in Korea, the HSEP began to be viewed as a representative regulatory policy that needed to be changed (Kim & Lee, 2003).

As a result, the expansion of the HSEP was halted during the 1990s. Some cities such as *Gunsan* (1990), *Chuncheon* (1991), and *Cheonan* (1995), which had implemented the HSEP earlier, even abolished this policy and returned to the free competition system. In these circumstances, the revisions to the HSEP have been made increasingly towards allowing greater school choice since the mid-1990s (MOE, 1998). For example, in 1996, middle school graduates in *Seoul* were allowed to submit an application to the schools of their own

choosing within the so-called “common catchment area.” Beginning in 2010, they were further permitted to apply to schools outside their designated catchment area. Furthermore, the current Lee Myung-bak government proposed to establish new special-purpose high schools referred to as international high schools and autonomous private high schools, which have greater autonomy in terms of student selection and curriculum operation (MEST, 2009). In contrast to this trend in which greater choice is increasingly being allowed, a growing number of local education district offices have adopted the HSEP especially since 2000.⁴

Prior Research on the Effect of the HSEP and Its Limitations

As noted earlier, almost all prior studies on the HSEP have focused on estimating the direct effect of HSEP implementation on student achievement, in part, because whether the HSEP has the *downward leveling effect* on student achievement has been a most hotly contested issue (Kim & Lee, 2003). Like school choice research,⁵ prior research on the effect of the HSEP on academic achievement offers mixed evidence. For example, Kim and colleagues (2008) found that the average achievement in the non-HSEP regions was significant higher than that in the HSEP region for both 10th and 11th graders. In contrast, S. Kang and associates (2005) found that the HSEP was positively related to school mean achievement even after controlling for family background and school location. On the other hand, Kim, Kim, and Ryu (2009) found no significant differences in student achievement between the HSEP vs. non-HSEP regions. In sum, prior empirical research examining the relationship between the HSEP and student achievement does not fully support the downward leveling effect hypothesis.

Although informing the HSEP debate concerning the downward leveling effect, these empirical studies tend to ignore another key issue related to whether HSEP implementation promotes educational equality. As a result, much of the HSEP debate concerning the equity issue remains at the theoretical level than supported by empirical research. In this study, we address this research gap by examining (a) the extent to which HSEP implementation is related to the separation of low and high SES students between schools and (b) the extent to which school's socioeconomic composition is related to student achievement.

Simultaneously addressing these two issues is important to understand the role of HSEP implementation in affecting educational equality, given that literature suggests a potential danger of socioeconomic separation between schools in youth development. For example, students in segregated rather than integrated school systems may be less prepared for the academic challenges of subsequent education (Gorard, 2009; see also Gorard & Rees, 2002). In addition, a high level of separation may increase a feeling of not belonging and anxiety

⁴This contradictory trend may be attributable, in part, to the fact that while whether or not one region adopts the HSEP is made by the local education district office based on an agreement among the members of the community, a majority of Korean students and parents favor the HSEP. The 2004 national data indicated that more than two-thirds of secondary school students (67%) and their parents (68%) supported the HSEP (Y. Kang et al., 2005).

⁵Prior research on the effect of school choice on student achievement offered mixed evidence across nations as well as within a nation. In the United States, for example, some studies (e.g., Chicago Public Schools, 2007; Hoxby, 2004; Hoxby & Rockoff, 2004) found positive effects from the use of vouchers and charter schools on student achievement, while other studies (e.g., Institute for Assessment and Evaluation, 2006; U.S. Department of Education, 2004) found negative effects. Some other studies found mixed results (e.g., Krueger & Zhu, 2004; Witte, 1998; Wolf, Gutmann, Puma, Rizzo, & Eissa, 2007).

and thus inhibit school performance (Massey & Fisheer, 2006). In the school effects literature, it is well established that the socioeconomic composition of a school has an impact on student achievement over and above the effect of the individual student's SES (Perry & McConney, 2010; Thrupp, 1995; Thrupp, Lauder, & Robinson, 2002; Willms, 2010). In short, by examining the relationships among HSEP implementation, the degree of socioeconomic separation between schools, and student achievement, our study not only will inform the HSEP debate on educational equality but also may help identify a potential mechanism by which HSEP implementation affects student achievement.

METHOD

Data and Sample

This study drew on data collected by the Korean Educational Development Institute (KEDI), a government-funded research institute, for its project called “Analysis on the Level of School Education and Its Actual Status of Korean Schools: Academic High Schools” (Kim, Namgung, & Kim, 2006). For this project aimed to examine trends in student achievement and attitudes, the KEDI has collected data from a nationally representative sample of 11th graders in academic high schools every three years since 2003. In 2010, the KEDI released 2003 and 2006 data to the public and researchers but 2003 data did not contain achievement data. Accordingly, we used 2006 data to examine how HSEP implementation was associated with the separation of low and high SES students between schools and how the socioeconomic composition of a school was related to school achievement.

To collect 2006 data, the KEDI employed a two-stage stratified sampling design in which (a) academic high schools ($n = 150$, approximately 11 % of the total number of academic high schools) were randomly sampled within each of five types of regions (Seoul, metro, small and medium sized cities, towns, and remote areas) proportionally to the population size; and then (b) two classes (approximately 66 students on average) in 11th grade were randomly sampled within selected schools. Those selected students were then questioned about their school, work, and home experiences; educational resources and support; and educational and occupational aspirations. Separate surveys were administered to students' families, teachers, and school principals to collect a wide range of family, class, and school information. The KEDI also administered achievement tests in reading (Korean language), math, and science in data collection. Of 150 schools, 135 schools participated in the survey and 128 schools participated in achievement tests (see Kim et al., 2006 for a full description of the design of the questionnaires, the sampling procedure, and the response rates). For the present investigation, we included those students who completed both survey and achievement tests. Due to the missing cases⁶ on academic achievement, the final sample was reduced to 7,350 (within 127 schools).

Unfortunately, the data that the current study used were obtained from the cross-sectional survey, offering self-reported prior achievement information only. Accordingly, with the current data set, it is difficult to establish the causal relationship between the HSEP and

⁶We imputed missing data for the student-level control variables except for achievement, gender, and attending a cram school, using a regression method. A full description of the missing imputation procedures is available from the authors.

school mean achievement. Furthermore, the limited information on prior achievement did not permit us to test the differential impact of the HSEP on achievement growth by student ability levels, which has been one of the most controversial issues in the HSEP debate. We acknowledge these as limitations of our study. At this moment, however, there are no publicly available longitudinal data that have traced a representative sample of high school students from 10th through 12th grade. Although some prior studies conducted by the KEDI researchers used longitudinal data to examine the relationship between HSEP implementation and student achievement, these data are not yet publicly available.

Measures

HSEP implementation—HSEP implementation was based on whether or not the school was located in a region of HSEP implementation as of 2006. This information was provided by the KEDI based on its national statistical database.

The socioeconomic composition of a school—The socioeconomic composition of a school was measured by the average SES of students within a school. The individual student-level SES variable was measured by the three indicators of SES: (a) parental education, (b) family income, and (c) home educational resources. Parental education was measured by the highest levels of parents' educational attainment (1 = middle school graduation or less; and 6 = Ph.D.). A higher one between mother's and father's educational attainment was chosen. Family income was the natural log of the monthly household income. To create a measure of home educational resources, we summed up responses on (a) whether there was a specific place to study in the home, (b) whether there were 100 books or more in the home, and (c) whether there was a daily newspaper in the home. Finally, using parental education, family income and home educational resources, we created an index of family SES with a mean of zero and a standard deviation of one.⁷

Student achievement—As noted earlier, academic high school students in Korea are sorted into two different tracks in 11th grade: liberal arts and natural sciences. Students in natural sciences take more advanced courses on math and science, while students in liberal arts take more advanced courses on humanities and social sciences. However, the KEDI's math and science test scores appear not to have reflected the differential curriculum between these two different tracks. Accordingly, for the present investigation, we focused on test scores on reading, which is the common subject for both tracks.⁸ Reading test scores ranged from 0 to 100.

Controls—Previous research suggests that there are significant differences in family and student background characteristics between the HSEP vs. non-HSEP regions (Byun, 2010) and that these background characteristics are significant predictors of student achievement in Korea (Park, Byun, & Kim, 2011). Accordingly, we included (a) individual SES, (b) family

⁷We conducted factor analysis using a varimax rotated solution to create the standardized index of SES using parental education, family income, and home resources. The first principal component accounted for 57 percent of the variance in the set of these variables. The factor loadings ranged from .761 (parental education) to .754 (family income).

⁸Our supplementary analyses of math and science achievement suggested few differences in the overall findings reported in this study. Results for math and science achievement are available from the authors.

structure (1 = two-parent families), (c) number of siblings, (d) parental educational expectations (1 = High school diploma; 5 = Ph.D.), (e) gender (1 = female), (f) hours spent self-studying per week (continuous variable), (g) hours spent using a computer per week (1 = 0 hour ; 6 = 3 hours or more), (h) attending a cram school (*hagwon*) (1 = attending a cram school), and (i) self-reported prior achievement at grade 10 (1 = very low; 9 = very high) as level-1 control variables. In addition, we included (a) school sector (1 = private), (b) average teaching experiences among teachers (continuous variable), and (c) school location (Seoul vs. metropolitan vs. small- and middle-sized city vs. rural area) as level-2 control variables.

Analytic Strategy

First, we completed descriptive analyses for schools (a) pooled across the regions, (b) in the regions of HSEP implementation, and (c) in the regions of non-HSEP implementation. In addition, depending on the measure's scale, we conducted *t*-tests or *chi-square* tests for each variable to determine if there were differences in student and school characteristics between the regions of HSEP implementation and the regions of non-HSEP implementation.

Next, to examine the extent to which HSEP implementation was related to the separation of low and high SES students between schools, we separately estimated the intraclass correlation coefficient (ICC) for the SES variable for the regions of HSEP implementation and for the regions of non-HSEP implementation. The ICC indicates the proportion of total variation in a variable (SES in this study) that lies between schools (Raudenbush & Bryk, 2002), and thus it can be interpreted as evidence on the extent of the separation of low and high SES students between schools (Willms, 1986). For example, if HSEP implementation were to contribute to reducing the separation of low and high SES students between schools, results should demonstrate a smaller ICC among schools in the regions of HSEP implementation than among schools in the regions of non-HSEP implementation. In contrast, if HSEP implementation were to contribute to increasing the separation of low and high SES students between schools, results should be opposite. The ICC was separately calculated for schools in the regions of HSEP implementation and in the regions of non-HSEP implementation with the one-way ANOVA model which contained the outcome variable (i.e., SES) with no explanatory variables (Raudenbush & Bryk, 2002). In this one-way ANOVA model, the level-1 (student-level) equation was specified as follows.

$$(SES)_{ij} = \beta_{0j} + r_{ij} \quad (1)$$

where β_{0j} is the average SES of school j and r_{ij} is the individual-specific error. The level-2 (school-level) equation was specified as follows

$$\beta_{0j} = \gamma_{00} + u_{0j} \quad (2)$$

where γ_{00} is the grand mean of SES and u_{0j} is the school-specific error.

Because only a few schools in rural areas were affected by the HSEP whereas all schools in Seoul and other large cities were affected (Table 1), we also estimated the ICCs after dropping both rural and metropolitan schools in order to rule out a potential confounding

effect by region. In other words, we re-estimated the ICCs only with schools in small- and medium-sized cities, which were overlapped in terms of being affected by the HSEP.

Another way to assess the extent to which HSEP implementation was related to the separation of low and high SES students between schools is to test differences in the likelihood of students attending high SES schools between the regions of HSEP implementation and the regions of non-HSEP implementation. For this analysis, following Park and Kyei (2010), we sorted schools from the lowest and highest SES and classified them into four categories (e.g., 1 = bottom 25%, 4 = top 25%) according to the quartile of the school mean SES distribution for the regions of HSEP implementation and for the regions of non-HSEP implementation, respectively. We then separately conducted ordered logistic regression analyses to predict the likelihood of students attending higher SES schools in the regions of HSEP implementation and in the regions of non-HSEP implementation. To more systematically investigate the role of SES in attending higher SES schools, we estimated two models. The first model included only the SES variable to ascertain the gross effect of SES. The second model additionally included the other level-1 variables to examine the net effect of SES. Using *z*-tests, we then tested whether there were significant differences in the size of coefficients of the SES variable between these two regions. If HSEP implementation were to increase the separation of low and high SES students between schools, the odds that low SES students attend high SES schools should be lower in the regions of HSEP implementation than in the regions of non HSEP implementation. Again, because only a few schools in rural areas were affected by the HSEP whereas all schools in Seoul and other large cities were affected, we replicated these ordered logistic regression analyses after dropping both rural and metropolitan schools to address a potential confounding effect by region.

Finally, we estimated the hierarchical linear model (HLM) (Raudenbush & Bryk, 2002) to examine the extent to the socioeconomic composition of a school was related to student achievement, after controlling for the other variables.⁹ In this model, the level-1 equation was specified as follows.

$$(\text{Reading achievement})_{ij} = \beta_{0j} + \sum_{k=1}^k \beta_{kj} X_{kij} + r_{ij} \quad (3)$$

where β_{0j} is the mean reading achievement of school *j* adjusted for student background characteristics, $\beta_{1j} - \beta_{kj}$ is the corresponding effect of each of student-level control variables (e.g., individual SES, family structure, gender, and etc.) and student achievement, and r_{ij} is the individual-specific error.

The level-2 equation was specified as follows:

⁹Before estimating the conditional model, where all of the independent variables were included, we first separately estimated the fully unconditional model, which contained only the dependent variable (i.e., reading achievement) with no covariates, for schools in the regions of HSEP implementation and in the regions of non-HSEP implementation, in order to assess the extent to which between-school variance in reading achievement existed. We found significant between-school variance in reading achievement in both regions, which justified the use of HLMs (see Appendix B). Meanwhile, because we were interested in the relationship between school mean SES and school achievement, rather than in the intercept, all variables entered into the conditional model were not centered around the grand or group mean.

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{Mean SES})_j + \sum_{q=2}^q \gamma_{0q} W_{qj} + u_{0j} \quad (4)$$

$$\beta_{kj} = \gamma_{k0} \quad (5)$$

where γ_{00} is the intercept, γ_{01} is the effect of school mean SES on school mean achievement, $\gamma_{02} - \gamma_{0q}$ the corresponding effect of each of school-level control variable (e.g., sector, location, and etc.) on school mean achievement, u_{0j} is the school-specific error. In Equation (5), γ_{k0} refers to the overall effect of the k th control variable at the student level. For this HLM analysis, we separately estimated the model for schools in the regions of HSEP implementation and in the regions of non-HSEP implementation, and then tested whether there were significant differences in the size of coefficients of the school mean SES variable between these two regions. Once again, we replicated the HLM analyses only with schools in the small- and medium-size cities (i.e., excluding schools in the metropolitan and rural areas) to address the issue of a potential confounding effect of region.

RESULTS

Descriptive Statistics

Table 1 presents the descriptive statistics on the variables used in analysis for schools pooled across the regions, in the regions of HSEP implementation, and in the regions of non-HSEP implementation (see Appendix A for the descriptive statistics for schools in the small- and medium-sized cities in the sample by HSEP implementation). Results showed significant (unadjusted) differences in reading achievement, student characteristics, and school factors between the HSEP and non-HSEP regions. With respect to reading achievement, on average, students in the regions of HSEP implementation (60.95) outperformed their counterparts in the regions of non-HSEP implementation (53.19), although the difference was not large enough to be statistically significant. On average, students in the HSEP regions were also more likely than their counterparts in the non-HSEP regions to come from high SES (0.15 vs. -.21), two-parent (81.4% vs. 77.9%), and smaller (1.36 vs. 1.46) families. Additionally, parents of students in the regions of HSEP implementation expected a higher level of education for their children than parents in the regions of non-HSEP implementation (3.63 vs. 3.46).

Concerning the student characteristics, a larger percent (49.1%) of students in regions of HSEP implementation were female when compared to their counterparts (40.8%) in the regions of non-HSEP implementation. On average, students in the regions of HSEP implementation spent more time studying (6.84 vs. 5.87) but less time using a computer (3.79 vs. 3.99) compared to their counterparts in the regions of non-HSEP implementation. A larger proportion (14.1%) of students in the HSEP regions attended a cram school compared to their counterparts in the non-HSEP regions (5.4%). Unlike reading achievement, there was no significant difference in self-reported prior achievement between students in the regions of HSEP implementation and students in the regions of non-HSEP implementation.

Finally, with respect to school characteristics, there were the significant gaps in school mean SES between the HSEP and non-HSEP regions more favoring the HSEP regions (.15) than the non-HSEP regions (-.24). In addition, as expected, all schools in Seoul and metropolitan cities in the sample were affected by the HSEP, whereas only a small portion of schools in rural areas were under the HSEP. On the other hand, there was no significant difference in school sector and average teaching experiences between schools in the regions of HSEP implementation and schools in the regions of non-HSEP implementation. Together, these results highlighted the importance of consideration of individual and school characteristics, especially the geographical region, when studying the effects of the HSEP.

Before turning to the results showing the extent to which HSEP implementation was related to the separation of low and high SES students between schools, we note the standard deviations of SES at the student and school levels in Table 1 as well as in Appendix A. This is (a) because our main goal is to assess whether between-school SES variation is smaller in the regions of HSEP implementation than in the regions of non-HSEP implementation or vice versa, (b) because it is possible that there may be preexisting differences in the degree of SES differentials among residents between the HSEP vs. non-HSEP regions, regardless of whether the regions are adopting the HSEP, and (c) because examining the standard deviations of SES at the individual and school levels can offer a useful insight into this issue.¹⁰ First of all, the standard deviations of SES at the student level were almost identical between the regions of HSEP (0.99) and non-HSEP (0.98) implementation, when all metropolitan and rural areas were considered (Table 1). This was also the case when only the small- and medium-sized cities were taken into account (HSEP regions: 0.96 vs. non-HSEP regions: 0.96, see Appendix A). However, when it comes to school mean SES, these two regions showed much different standard deviations. Specifically, when all metropolitan and rural areas were considered (Table 1), the standard deviation of school mean SES in the regions of HSEP implementation was 0.33, whereas the corresponding standard deviation in the regions of non-HSEP implementation was 0.42. Furthermore, when only the small- and medium-sized cities were considered (Appendix A), the standard deviation of school mean SES in the regions of HSEP implementation was only the half of that in the regions of non-HSEP implementation (0.18 vs. 0.36). In sum, the similar level of overall SES differentials among students between the regions of HSEP vs. non-HSEP implementation but the much smaller between-school SES variation in the regions of HSEP implementation than in the regions of non-HSEP implementation suggested some potential impacts of the HSEP in regard to how students are separated into schools of different mean SES.

Differences in the Degree of the Separation of Low and High SES Students between Schools by HSEP Implementation

Between-school variance in SES—The upper panel of Table 2 shows the ICCs for the SES variable among schools in the regions of HSEP vs. non-HSEP implementation. The proportion of variance in the SES composite that lied between schools in the regions of HSEP implementation was .09, indicating that 9% of the total variance in SES could be attributable to differences between schools in these regions. On the other hand, the ICC

¹⁰We thank an anonymous reviewer for suggesting this useful analytic strategy.

was .17 for the schools in the regions of non-HSEP implementation, showing almost double between-school variance in SES than in the regions of HSEP implementation.

The lower panel of Table 2 shows the ICCs for the SES variable among schools in the small- and medium-sized cities of HSEP vs. non-HSEP implementation. The ICC for the schools in the small- and medium-sized cities of HSEP implementation was only .02. The corresponding ICC for the schools in the similar-sized cities of non-HSEP implementation was .12, showing six times greater between-school variance in SES than in the similar-sized cities of HSEP implementation. In sum, results suggested smaller between-school variance in SES in the regions of HSEP implementation than in the regions of non-HSEP implementation.

Likelihood of attending higher SES schools—The upper panel of Table 3 presents results of the ordered logistic regression models predicting the likelihood of students attending higher SES schools for the regions of HSEP vs. non-HSEP implementation, including the large cities and rural areas. Because our interests are in the effect of SES on the likelihood of attending higher SES schools, we focus only on interpreting the coefficient of the SES variable (in bold in Table 3). Model 1, including the SES variable only, showed that although high SES students tended to be more likely than lower SES students to attend higher SES schools in both regions of HSEP and non-HSEP implementation, the odds that high SES students did so was much smaller in the regions of HSEP implementation than in the regions of non-HSEP implementation (.55 vs. .82). Model 2, where all other level-1 variables were additionally included, also showed significant differences in the odds of students attending higher SES schools between the regions of HSEP vs. non-HSEP implementation. Specifically, one-standard deviation increase in SES was associated with an increase of 67% ($[e^{(.51)} - 1] * 100\% = 67\%$) in the odds of attending a higher SES school in the regions of HSEP implementation, whereas the corresponding increase was 103% in the regions of non-HSEP implementation.

The lower panel of Table 3 presents ordered logistic regression results for the small- and medium-sized cities (i.e., excluding the large cities and rural areas) of HSEP vs. non-HSEP implementation. Consistent with previous results, Models 1 and 2 showed significant differences in the odds of students attending higher SES schools between the similar-sized cities of HSEP vs. non-HSEP implementation (.32 vs. .72; .35 vs. .59). In sum, results showed that students from a disadvantaged background in the regions of HSEP implementation were less likely than their counterparts from a similar background in the regions of non-HSEP implementation to be separated into low SES schools.

The Relationship between the Socioeconomic Composition of a School and Student Achievement

As indicated above, if the socioeconomic composition of a school were not related to student achievement, HSEP implementation itself might not necessarily encourage educational equality even though it led to the less substantial separation of low and high SES student between schools as revealed by previous results (Tables 2 and 3). However, if the socioeconomic composition of a school were to matter to student achievement, HSEP

implementation may to some extent promote educational equality by reducing the separation of low and high SES between schools. To address this issue, we conducted HLM analyses to examine the extent to which the socioeconomic composition of a school was associated with school achievement, and present HLM results in Table 4. Because our interests are in the relationship between the socioeconomic composition of a school and student achievement, we focus only on interpreting the coefficient of the school mean SES variable (in bold in Table 4).

The first and second columns of Table 4 show HLM results for the schools in the regions of HSEP implementation and in the regions of non-HSEP implementation (including all metropolitan and rural areas) respectively. Results showed that school mean SES was significantly related to school achievement in both regions of HSEP and non-HSEP implementation, even after controlling for the other background variables. Specifically, one unit increase in school mean SES was associated with an increase of approximately 11 points and 16 points in reading achievement in the regions of HSEP implementation and in the regions of non-HSEP implementation, respectively.

Finally, the third and fourth columns of Table 4 show HLM results for the schools in the small-and medium-sized cities of HSEP implementation and in the similar-sized cities of non-HSEP implementation (i.e., excluding both metropolitan and rural areas) respectively. Results showed that when all metropolitan and rural areas were excluded, school mean SES was insignificantly related to student achievement in the regions of HSEP implementation, whereas it remained significant for the regions of non-HSEP implementation. In sum, results showed that the socioeconomic composition of a school students attended was important to predict student achievement in the regions of non-HSEP implementation but this was not the case in the regions of HSEP implementation.

DISCUSSION

While the idea of expanding school choice has increasingly become part of educational reform in many countries, the controversy continues on whether choice reform is effective in raising student achievement and facilitating educational equality. Numerous studies have been conducted to address these issues, but empirical work has focused mostly on Western countries. Although a growing number of studies have investigated the choice issue in non-Western countries (e.g., Constant et al., 2010; Tooley et al., 2011), we still know too little about the choice debate, subsequent reform, and its consequences in these countries. In this study, we have attempted to address this research gap by examining Korea's choice debate centering on the HSEP and investigating how this random school assignment policy shapes educational equality.

Using a nationally representative sample of 11th graders in Korea, we found that there was smaller between-school variance in SES in the regions of HSEP implementation, where students were randomly assigned to a school based on place of residence, than in the regions of non-HSEP implementation, where students were allowed to choose a school. This finding suggests that students from diverse socioeconomic backgrounds are more equally distributed among schools in the regions of HSEP implementation than among schools in the regions of

non-HSEP implementation. In addition, we found that the extent to which low SES students attend higher rather than lower SES schools was significantly higher in the regions of HSEP implementation than in the regions of non-HSEP implementation. This finding suggests that low SES students in the regions of HSEP implementation are less likely to be separated into low SES schools than are their counterparts in the regions of non-HSEP implementation. Finally, we found that the socioeconomic composition of a school was significantly related to student achievement in the regions of non-HSEP implementation but not in the regions of HSEP implementation, when the metropolitan and rural areas were excluded.¹¹ This finding suggests that student achievement significantly depends on the socioeconomic composition of a school students attended in the regions of non-HSEP implementation, whereas it is not the case in the regions of HSEP implementation. Together, these findings call into question the assertion of the critics of the HSEP that greater choice by abolishing the HSEP would achieve more equitable educational outcomes for low SES students.

However, we do not claim the causal effect of the HSEP in light of the nature of cross-sectional data used and unmeasured characteristics (e.g., differences in attendance at vocational high schools between the HSEP vs. non-HSEP regions) that we were unable to control for but might confound the HSEP effect. The major point that we wished to highlight throughout the present study is that more attention needs to be paid to the role of the HSEP in promoting educational equality. As described earlier, prior research has focused on testing the direct impact of the HSEP on student achievement. To our best knowledge, no prior research has empirically examined the issue of how HSEP implementation shapes educational equality. In this study, we have attempted to address this lack of attention by simultaneously assessing how HSEP implementation was related to the separation of low and high SES students between schools and how the socioeconomic composition of a school was in turn related to student achievement. Further studies using longitudinal data and more rigorous methods allowing for causal inference should be conducted to further inform the debate about the role of the HSEP for educational equality. In addition, future research should uncover the within-school learning processes associated with HSEP implementation.

Despite these limitations, the current study has broader implications for the school choice literature beyond Korean education. Our empirical analyses suggest that greater choice may increase the achievement gap between high and low SES students by increasing the separation of low and high SES students between schools. Although may be directly incomparable with evidence in other countries, this finding is generally consistent with several studies in other countries. For example, in the examination of the Scottish experience of parental choice of schools, Willms and Echols (1992) found that the choice process is related to increased SES segregation.¹² In New Zealand, Lauder and Hughes (1999) also

¹¹One possible explanation of the insignificant role of the socioeconomic composition of a school in the regions of HSEP implementation after excluding the metropolitan and rural areas may be that between-school variation in SES became much smaller in the regions of HSEP implementation than did in the regions of non-HSEP implementation as evidenced by the ICCs in Table 2 (as well as the standard deviations of the school mean SES variable in Appendix A), on the one hand. On the other hand, there may be residential segregation in the metropolitan areas so that students may be still unequally distributed across schools in the regions of HSEP implementation, which may result in school mean SES being important to predict student achievement in these regions.

¹²However, in the examination of the trends in between school segregation over time in the United Kingdom, Gorard and Fitz (1998; see also Gorard et al., 2001) found that socioeconomic stratification of school students declined right after the introduction of choice policies, inconsistent with the finding of Willms and Echols (1992).

found that voucher plans tended to increase stratification among students. Similarly, McEwan, Urquiola, and Vegas (2008) found that school choice in Chile increased stratification while having little effect on average achievement. In the United States, Bifulco, Ladd, and Ross (2009; see also Bifulco & Ladd, 2007) found that schools in Durham, North Carolina, were more segregated by race and class as a result of school choice program than they would be if all students attended their geographically assigned schools. Likewise, Ni (2010) found that the charter school program in Michigan tended to intensify the isolation of disadvantaged students in less effective urban schools serving mostly low SES students. Together, these findings suggest that increasing school choice may not translate into greater educational equality without taking other policy considerations into account.

Appendix

Appendix A

Descriptive Statistics of the Variables Used in Analysis (Small- and Medium-Sized Cities Only)

Variable	HSEP regions	Non-HSEP regions	Total
<i>Level 1: Student level (Ns)</i>	1,210	1,470	2,680
Reading achievement	62.06 [*] (16.94)	60.30 (18.76)	61.09 (17.98)
SES	0.16 ^{***} (0.96)	0.01 (0.96)	0.08 (0.97)
Parental education	3.04 ^{***} (1.18)	2.80 (1.17)	2.91 (1.18)
Family income (log)	5.78 ^{**} (0.67)	5.70 (0.70)	5.73 (0.69)
Educational resources in the home	1.84 (0.93)	1.82 (0.93)	1.83 (0.93)
Two-parent family (%)	82.0	79.9	80.8
Number of siblings	1.37 (1.13)	1.41 (1.20)	1.39 (1.17)
Parental educational expectations	3.62 (0.93)	3.59 (0.96)	3.60 (0.95)
Female (%)	47.5 [*]	43.3	45.2
Time spent studying	6.75 (5.77)	7.48 (12.53)	7.15 (10.06)
Time spent using a computer	3.80 (1.25)	3.81 (1.38)	3.80 (1.32)
Attending a cram school (<i>hagwon</i>)	9.9 ^{**}	6.3	7.9
Self-reported prior achievement	5.11 (1.85)	5.22 (1.81)	5.17 (1.83)
<i>Level 2: School level (Ns)</i>	19	25	44
Mean SES	0.16 (0.18)	0.01 (0.36)	0.07 (0.30)
Private school (%)	57.9	56.0	56.8
Teaching experiences	16.15 (4.34)	16.37 (4.02)	16.28 (4.11)

Note. The numbers are mean and the numbers in parentheses are standard deviations unless percentages are noted. *t*-tests and *Pearson chi-square* tests were conducted for continuous and categorical variables, respectively. HSEP= High School Equalization Policy, SES = socioeconomic status

*** denote significant differences from non-HSEP regions under $p < .001$.

** denote significant differences from non-HSEP regions under $p < .01$.

* denote significant differences from non-HSEP regions under $p < .05$, respectively.

Appendix B

Results from the One-Way ANOVA Model Predicting Reading Achievement by High School Equalization Policy Implementation

Fixed effect	Pooled Sample				Small- and Medium-Sized Cities Only			
	HSEP regions (4,258 students in 70 schools)		Non-HSEP regions (3,095 students in 57 schools)		HSEP regions (1,210 students in 19 schools)		Non-HSEP regions (1,470 students in 25 schools)	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
Intercept	60.79***	1.03	52.00***	1.59	62.27***	1.71	60.14***	2.16
Variance components								
Level 2 (school)	68.96		138.15		51.65		111.81	
Level 1 (student)	262.41		274.87		233.43		252.27	
Total	331.38		413.01		285.08		364.08	
Intraclass correlation coefficient	0.21		0.33		0.18		0.31	

HSEP = High School Equalization Policy

p<.001 (two-tailed tests)

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Table 1

Descriptive Statistics of the Variables Used in Analysis (Pooled Sample)

Variable	HSEP regions	Non-HSEP regions	Total
<i>Level 1: Student level (Ns)</i>	4,258	3,092	7,350
Reading achievement	60.95 *** (18.11)	53.19 (20.03)	57.69 (19.33)
SES	0.15 (0.99)	-0.21 (0.98)	0.00 (1.00)
Parental education	3.03 *** (1.21)	2.60 (1.13)	2.85 (1.20)
Family income (log)	5.77 *** (0.69)	5.58 (0.74)	5.69 (0.72)
Educational resources in the home	1.84 *** (0.93)	1.67 (0.95)	1.77 (0.94)
Two-parent family (%)	81.4 ***	77.9	80.0
Number of siblings	1.36 *** (1.17)	1.46 (1.26)	1.41 (1.21)
Parental educational expectations	3.63 *** (0.95)	3.46 (0.94)	3.56 (0.95)
Female (%)	49.1 ***	40.8	45.6
Time spent studying	6.84 *** (6.38)	5.87 (9.88)	6.43 (8.05)
Time spent using a computer	3.79 *** (1.28)	3.99 (1.37)	3.87 (1.32)
Attending a cram school (<i>hagwon</i>)	14.1 ***	5.4	10.4
Self-reported prior achievement	5.09 (1.85)	5.08 (1.81)	5.09 (1.83)
<i>Level 2: School level (Ns)</i>	70	57	127
Mean SES	0.15 *** (0.33)	-0.24 (0.42)	-0.03 (0.42)
Private school (%)	55.7	42.1	(49.6)
Teaching experiences	17.28 (3.61)	16.90 (3.63)	17.11 (3.61)
Location (%)	***		
Seoul	21.4	—	11.8
Metro	47.1	—	26.0
Small- and medium-sized city	27.1	43.9	34.6
Rural area	4.3	56.1	27.6

Note. The numbers are mean and the numbers in parentheses are standard deviations unless percentages are noted. *t*-tests and *Pearson chi-square* tests were conducted for continuous and categorical variables, respectively. HSEP= High School Equalization Policy, SES = socioeconomic status

** denote significant differences from non-HSEP regions under $p < .01$.

* denote significant differences from non-HSEP regions under $p < .05$, respectively.

*** denote significant differences from non-HSEP regions under $p < .001$.

Table 2

Intraclass Correlation Coefficient of Socioeconomic Status by High School Equalization Policy Implementation

Pooled Sample				
<i>Random effect</i>	<i>HSEP regions</i>		<i>Non-HSEP regions</i>	
	<i>Variance components</i>	<i>df</i>	<i>Variance components</i>	<i>df</i>
School level	0.09	69	0.16	56
Student level	0.89		0.80	
ICC	0.09		0.17	
Small- and Medium- Sized Cities Only				
<i>Random effect</i>	<i>HSEP regions</i>		<i>Non-HSEP regions</i>	
	<i>Variance components</i>	<i>df</i>	<i>Variance components</i>	<i>df</i>
School level	0.02	18	0.11	24
Student level	0.91		0.83	
ICC	0.02		0.12	

ICC = Intraclass correlation coefficient, HSEP = High School Equalization Policy

Table 3

Ordered Logistic Regression of the Likelihood of Attending Higher Socioeconomic Status Schools by High School Equalization Policy Implementation

Pooled Sample						
Variable	HSEP regions (n = 4,258)			Non-HSEP regions (n = 3,092)		
	Model 1	Model 2		Model 1	Model 2	
	<i>Coef.</i>	<i>Robust SE</i>	<i>Coef.</i>	<i>Robust SE</i>	<i>Coef.</i>	<i>Robust SE</i>
SES	0.55*** [†]	0.05	0.51*** [†]	0.05	0.82***	0.06
Two-parent family			-0.17	0.09	-0.10	0.09
Number of siblings			0.00 [†]	0.02	-0.07**	0.03
Parental educational expectations			0.03	0.05	0.15***	0.04
Female			-0.46	0.37	-0.46	0.34
Time spent studying			0.03** [†]	0.01	0.07***	0.01
Time spent using a computer			-0.10**	0.03	-0.13**	0.04
Attending a cram school			0.57***	0.19	0.26	0.22
Self-reported prior achievement			-0.10**	0.03	-0.04	0.04

Small- and Medium-Sized Cities Only						
Variable	HSEP regions (n = 1,210)			Non-HSEP regions (n = 1,470)		
	Model 1	Model 2		Model 1	Model 2	
	<i>Coef.</i>	<i>Robust SE</i>	<i>Coef.</i>	<i>Robust S.E.</i>	<i>Coef.</i>	<i>Robust SE</i>
SES	0.32*** [†]	0.06	0.35*** [†]	0.07	0.72***	0.09
Two-parent family			-0.24**	0.09	-0.20	0.19
Number of siblings			-0.04	0.04	-0.09**	0.03
Parental educational expectations			-0.07 [†]	0.09	0.15*	0.07
Female			-0.67	0.72	-1.50	0.89
Time spent studying			0.01	0.02	0.05	0.03
Time spent using a computer			-0.03	0.06	-0.13	0.08
Attending a cram school			0.25	0.32	-0.20	0.37
Self-reported prior achievement			-0.07	0.07	-0.05	0.06

Note. The dependent variable classified schools attended by students into four ordinal categories (i.e., 1 = bottom 25%, 4 = top 25%) according to quartile of the distribution for the regions of HSEP implementation and non-HSEP implementation, respectively. HSEP = High School Equalization Policy, SES = socioeconomic status

- [†] denote significant differences in the size of coefficients from non-HSEP regions under $p < .05$.
- [‡] denote significant differences in the size of coefficients from non-HSEP regions under $p < .10$, respectively.
- *** $p < .001$
- ** $p < .01$
- * $p < .05$ (two-tailed tests)

Table 4
Hierarchical Linear Models Predicting Reading Achievement by High School Equalization Policy Implementation

<i>Fixed effect</i>	Pooled Sample			Small- and Medium-Sized Cities Only		
	HSEP regions (4,258 students in 70 schools)	Non-HSEP regions (3,095 students in 57 schools)	HSEP cities (1,210 students in 19 schools)	Non-HSEP cities (1,470 students in 25 schools)		
	<i>Coef.</i>	<i>SE</i>	<i>Coef.</i>	<i>SE</i>	<i>Coef.</i>	<i>SE</i>
(Intercept)	19.72 **	6.24	30.26 ***	5.39	32.07 ***	7.40
<i>Level 1: Student level</i>						
SES	0.04	0.24	0.13	0.31	-0.13	0.42
Two-parent family	-1.05	0.57	0.57	0.66	-2.52 *†	1.02
Number of siblings	-0.52 **	0.19	-0.11	0.22	-0.85 *†	0.34
Parental educational expectations	0.89 ***	0.24	0.92 **	0.30	0.89 *	0.43
Female	3.94 ***†	0.80	6.71 ***	0.80	2.80 *	1.27
Time spent studying	0.09 *	0.04	0.01	0.03	0.12 ‡	0.07
Time spent using a computer	0.25	0.17	0.14	0.21	0.28	0.31
Attending a cram school	1.03	0.65	-1.52	1.22	0.95	1.32
Self-reported academic achievement	4.31 ***	0.13	4.02 ***	0.16	4.02 ***†	0.23
<i>Level 2: School level</i>						
Mean SES	11.04 ***	2.60	16.25 ***	2.82	1.60	9.87
Private	0.06	1.74	-2.18	2.17	1.71	3.64
Teaching experiences	0.01	0.25	-0.17	0.29	0.32	0.42
Location (rural area omitted)						
Seoul	7.78	4.38	—	—	—	—
Metro	14.11 **	4.15	—	—	—	—
City	13.36 **	4.33	5.81 *	2.44	—	—
<i>Variance components</i>						
Level 2 (school)	41.45		51.43		45.06	53.45
Level 1 (student)	190.16		216.40		170.43	208.97
<i>Proportion of variance explained by model</i>						

Fixed effect	Pooled Sample				Small- and Medium-Sized Cities Only			
	HSEP regions (4,258 students in 70 schools)		Non-HSEP regions (3,095 students in 57 schools)		HSEP cities (1,210 students in 19 schools)		Non-HSEP cities (1,470 students in 25 schools)	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
Level 2 (school)		0.40		0.63		0.13		0.52
Level 1 (student)		0.28		0.21		0.27		0.17

HSEP = High School Equalization Policy, SES = socioeconomic status

[†] denote significant differences in the size of coefficients from non-HSEP regions under p < .05.

[‡] denote significant differences in the size of coefficients from non-HSEP regions under p < .10, respectively.

*** p<.001

** p<.01

* p<.05 (two-tailed tests)