

Causal Effects of Single-Sex Schools on College Attendance: Random Assignment in Korean High Schools

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ABSTRACT

Improvements associated with the introduction of single-sex public education. However, there is no consensus on the effects of single-sex education on the attainment of students in various fields of study.

We exploit a quasi-random variation in the random assignment of students to single-sex public high schools in some rural high schools to estimate causal effects of single-sex schools on college attendance.

Our estimates show significant positive effects of both all-girls and all-boys high schools on four-year college attendance and negative effects on two-year junior college attendance.

The effect of all-boys schools is not improved by the large size of male teachers in all-boys schools. In contrast, the effect of all-girls schools is improved by the large size of female teachers in all-girls schools.

Our findings have implications for the design of public education. In particular, the effect of single-sex schools on college attendance is sensitive to the gender of teachers.

KEYWORDS
single-sex schools; random assignment; college attendance; gender inequality; Korea

INTRODUCTION

High-quality schooling is a particular way of organizing student learning opportunities for boys and girls.

In contrast to common assumptions that educational reforms reduce gender disparities in schooling opportunities, several studies have found that educational reforms may reduce traditional gender role inequalities and provide gender-differentiated learning experiences.

Some empirical studies in the US and other western countries have found better educational outcomes among students attending single-sex (particularly all-girls) schools than their counterparts in coeducational schools.

However, in rural countries students tend to benefit from attending single-sex schools over coeducational schools.

It is difficult to know what the differences between single-sex and coeducational schools, if any, mean, since the differences may reflect unobserved biases associated with school choice.

RANDOM ASSIGNMENT IN KOREA

"High School Equalization Policy"

• Lottery is used to randomly assign middle school students to high schools across districts.

• The random assignment is applied regardless of whether schools are single-sex or coeducational.

• The random assignment is applied regardless of whether schools are public or private.

• Students have to take the randomly assigned schools, if they do not like the assignment, they have to move to another school district where they are subject to another random assignment.

• Implemented since 1974.

RESEARCH QUESTIONS

1. Assess causal effects of single-sex schools on college attendance by taking advantage of the unique features of random assignment in Korea.
2. Assess separate effects of all-girls schools and all-boys schools as compared to coeducational schools.
3. Assess separate effects of single-sex schools on four-year college attendance and two-year junior college attendance.
4. Assess the extent to which the share of same-gender teachers explains the effect of single-sex schools (role model hypothesis).

DATA AND METHOD

• National compilation of school-level data: each high school reported the number of 2008 seniors who went to four-year college and two-year junior college.

• All schools across 18 school districts in two largest metropolitan areas (Seoul & Pusan) where the random assignment has been widely implemented.

• Checking mechanisms: due to the lack of information on socioeconomic conditions of schools, we allow for selection on major SES variables for students attending each type of schools using individual-level data.

• District fixed-effect regression for girls and boys, separately.

• <https://doi.org/10.3386/w24340>

Table 1. School Characteristics

	All	All-Boys	All-Girls
Number of schools	40 (1)	20 (1)	20 (1)
Number of students	28,000 (1)	14,000 (1)	14,000 (1)
Male students	14,000 (1)	14,000 (1)	0 (0)
Female students	14,000 (1)	0 (0)	14,000 (1)
Teachers	1,000 (1)	500 (1)	500 (1)
Male teachers	500 (1)	500 (1)	0 (0)
Female teachers	500 (1)	0 (0)	500 (1)

Table 2. Checking Randomness (Individual-Level Data)

	All	All-Boys	All-Girls
Age	17.0	17.0	17.0
SES	1.0	1.0	1.0
SES ²	1.0	1.0	1.0
SES ³	1.0	1.0	1.0
SES ⁴	1.0	1.0	1.0
SES ⁵	1.0	1.0	1.0
SES ⁶	1.0	1.0	1.0
SES ⁷	1.0	1.0	1.0
SES ⁸	1.0	1.0	1.0
SES ⁹	1.0	1.0	1.0
SES ¹⁰	1.0	1.0	1.0

CAUSAL EFFECTS OF SINGLE-SEX SCHOOLS

Table 3. Effects of All-Girls School

	All-Boys	All-Girls	All
4-year college	0.012	0.021	0.017
2-year college	-0.015	-0.010	-0.012
Total college	0.000	0.011	0.008
Female teachers	0.001	0.002	0.001
Male teachers	-0.001	-0.001	-0.001

Table 4. Effects of All-Boys School

	All-Boys	All-Girls	All
4-year college	0.015	0.012	0.013
2-year college	-0.010	-0.008	-0.009
Total college	0.005	0.004	0.004
Female teachers	0.001	0.001	0.001
Male teachers	0.001	0.001	0.001

• Higher percentage of four-year college attendance among all-girls schools than coed schools for girls (0.2 standard deviation)

• Higher percentage of four-year college attendance among all-boys schools than coed schools for boys (0.3 standard deviation advantage)

• Negative effects of both all-boys and all-girls schools for two-year junior college.

• The share of male teachers substantially explains the effect of all-boys schools, while the share of female teachers hardly explains the effect of girls schools.

• A potential mechanism (role model hypothesis)

NEXT STEPS

- Causal effects of single-sex schools on STEM (Science, Technology, Engineering, and Math) careers
- Causal effects of single-sex schools on long-term demographic behaviors (marriage, divorce, and fertility)
- Testing alternative mechanisms through which single-sex school affects total